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*Illustrated.

THE railroads of Missouri have decided to appeal the train crew legislation in that state to the highest court, viz., the people themselves. They are circulating a petition for submission of the measure to a referendum vote. There seems to be little doubt that they will get the necessary signatures to the petition. This action by the Missouri roads merits the heartiest commendation. It seems to be the belief of many that the interests of the railways and the people are necessarily conflicting, and that whatever will hurt the former must be good for the latter. No better means for correcting this notion is available than that of public discussion of train crew legislation. The appeal of the roads to the people may or may not result in the nullification of the train crew legislation; but the evidence it will afford that the roads are not afraid to lay their case before the public can hardly fail to produce a favorable impression on the latter. The experience of recent years indicates that if, in the long

run, the roads are to get fair treatment, they can do so only by going behind governors, legislatures and commissions to those who make and unmake all public officials. The roads secured a referendum in Arizona last fall on several measures that had been passed by the legislature. They conducted an actual literary and speech-making campaign, and while all the measures were adopted, the vote polled against them was large, and it seemed that if the campaign had lasted a few weeks longer most of the bills would have been beaten. If the roads in Missouri do get the train crew law submitted to the people it is to be hoped they will carry on an actual educational campaign throughout the state. Only in this way can they actually test the value of a referendum. The arguments that can be made against the train crew legislation are so overwhelmingly convincing to every rational mind that if the roads cannot get the public to vote against it their situation is bad, indeed.

AT the convention of the International Railway Fuel Association, held last week in Chicago, railway fuel contracts and the storage of railway coal were discussed at some length. The coal operators strongly urged a reduction of the "spread" or difference between the maximum and minimum amounts that could be demanded by the railways at their pleasure, as specified in all coal contracts. They also advocated an extension of the practice of storing a large amount of coal in the summer months for the next winter's use. In support of this it was pointed out that plenty of coal cars are available in the summer, while the contrary is true during the cold weather. Furthermore, the coal could be hauled in summer without further complicating the traffic problem, which, on most roads, is serious during the winter months. If coal is stored, as suggested, the necessity for the wide range of daily or weekly tonnage that can be demanded, which sometimes is as much as 100 per cent, disappears. On the other hand, it seems that coal stored for several months will cost from 15 to 60 or 70 cents a ton more than coal direct from the mines. The exact amount varies with the quality. This is due to the cost of the extra handling and the depreciation of the fuel, owing both to the rehandling and the weathering. While some slight reduction in price might be offered in some cases, it would not cover the difference in value and the locomotives would be supplied with a lower grade product at a higher price. The present practice, while evidently somewhat of a hardship to the coal operator, is the only satisfactory one to the railway, and unless conditions change materially it will probably be continued. A fuel contract that is entirely satisfactory to the operators is in use by one railway, at least, and does not require the storage of coal during the summer. In this case the future requirements are estimated with the greatest care and the "spread" is but a small percentage of the minimum. When more coal than the maximum is required, a premium of a small amount is paid for the first mutually determined amount, a larger premium for the next increment and so on. Such a contract is practically ideal if the future requirements can be determined with reasonable accuracy.

THE use of the telephone in railroad service increases so rapidly that its extent can be realized only by frequently looking back. Our railroads neglected the advantages of long-distance telephone facilities for a number of years, but they are rapidly catching up, and today—as New York City reports in use 500,000 telephones, or nearly as many as the aggregate number in the three cities of London, Paris and Berlin—the railroads of America can report nearly or quite 100,000 miles of long distance telephone circuits. (In the matter of ordinary short-distance telephone communication the railroads have not been lacking in enterprise.) This estimated total is based on the statistical report of the Interstate Commerce Commission, noticed in our issue of May 16, page 1063, and on the data given by Mr. Johnson, superintendent of telegraph of the Pennsylvania Railroad, in his paper which was read last week

at St. Louis, and which is abstracted in another column. The government's total of road having telephone despatching wires is 68,097 miles. On the basis of the partial statistics gathered by Mr. Johnson it will be safe to add to this mileage at least one-third to represent other circuits, used for messages; and in the five months since the statistics were collected there has been such a considerable addition that the total is more likely to run above than below 100,000 miles of line. In addition to this there is an aggregate of 23,002 miles of road on which telephones are used for manual block signaling, an increase in 12 months of 6,458 miles. That the introduction of the telephone has greatly simplified train despatching is now a commonplace fact. Not so fully appreciated, perhaps, is the value of the portable telephone. Mr. Johnson estimates that telephones carried on work trains increase the efficiency of such trains no less than 40 per cent.; and his track-repair foremen, of whom 138 have telephones, are estimated to be 45 per cent. more efficient because of this aid. While these, no doubt, are rough estimates, they are highly suggestive, nevertheless. Among other interesting facts Mr. Johnson reports 3,324 telephones in use in booths and in other places along the Pennsylvania Railroad outside of stations, towers and offices. The Western Electric Company, which reports new orders for telephone despatching apparatus nearly every week, this week gives the names of eight railroads, on which 2,200 miles of telephone circuits are to be put up. One of these is an electric road, the order for which covers thirty miles; the others are the Chicago, Burlington & Quincy, 405 miles; Chicago & North Western, 105 miles, and a message circuit of 85 miles; Denver & Rio Grande; Lehigh & New England; Missouri, Kansas & Texas, 1,000 miles; New York Central, 70 miles, and Seaboard Air Line, 285 miles. The Denver & Rio Grande order includes 26 portable sets for use on trains.

SOME DISPUTED POINTS IN RAILWAY VALUATION.

3.—Depreciation.

A VERY important problem in railway valuation, and one regarding which there is a wide divergence of opinion, is that of depreciation and the allowance which should be made for it. Many railway men contend that no deduction for depreciation of track and roadbed should be made in the case of a properly maintained road. For the first ten years after a road is built, or until renewals become fairly constant, there is undoubtedly depreciation of the ties, rails and track structure which is not offset by repairs and renewals. But during the same time there is a definite appreciation of the roadway and surface, owing to their becoming better adapted to the service of transportation, so that at the end of this period the entire track and roadway are more valuable for the purpose for which they exist than when built. After this period of approximately ten years both depreciation, on the one hand, and appreciation due to solidification and adaptation on the other hand, cease if a road is reasonably maintained.

The general practice of the state commissions has been to deduct a percentage for depreciation from the various units entering into the valuation. It would seem that if depreciation should be thus allowed for, so ought appreciation to be, and in some cases it has been. This item of appreciation has been handled in two ways. In making an appraisal of the Spokane & Inland Empire the Public Utilities Commission of Washington fixed 110 per cent. of the reproduction cost new as the reproduction value of the grading at the time the valuation was made. In Minnesota appreciation was provided for by a separate item, "adaptation and solidification of roadbed" amounting for all the roads in the state to \$11,743,007, which was 21 per cent. of the reproduction cost of the grading, clearing and grubbing. The commission questioned, however, whether this allowance was proper. In the valuation by the Massachusetts commission of the New York, New Haven & Hartford an allowance of \$500 per mile, or a total of \$805,000, was made for solidification, this being considered by the commission as very low. A similar allowance was also made by the commission in Washington in valuing the

roads of that state. This appreciated value was also admitted in the recent valuation in New Jersey, but because of its indefiniteness no figure for it was included in the final report.

In Michigan and Wisconsin, on the other hand, depreciation was deducted without any allowance being made for appreciation.

Aside from the method of allowing for depreciation, the extent of the allowance for it has varied greatly. For instance, in New Jersey the item for track laying and surfacing was depreciated 25 per cent. on the assumption that while 50 per cent. of the labor was devoted to surfacing and remained in the property, undiminished, the other 50 per cent. was devoted to the laying of the track and depreciated with the track structure. In the valuation of the Spokane & Inland Empire an annual depreciation of 6.7 per cent. was charged against the item of track laying and surfacing. In Michigan this charge was 2.5 per cent., while in Wisconsin, Minnesota and Massachusetts full reproduction value new was allowed. Again, the item of ballast was depreciated 33.2 per cent. in the Wisconsin appraisal, while in Minnesota, Michigan and Massachusetts no deduction on this account was made.

With reference to equipment, the problem is perhaps less complicated, but even here at least two methods have been used. The plan adopted in Michigan and later used in Wisconsin was for representatives of the commission to make examinations of large numbers of each kind of equipment operating within the state, and accept the average per cent. of depreciation of the equipment actually inspected as typical of all of it. In Michigan about 33,000 freight cars were thus inspected, while in Wisconsin it was stipulated that 50 per cent. of the locomotives, 50 per cent. of the passenger cars, and not less than 20 per cent. of each class of freight cars operating wholly or partly in Wisconsin should be inspected. The percentages founded on these inspections were then applied to all the equipment. In Washington, on the other hand, the depreciated value of the equipment was determined by the use of mortality tables. Knowing the ages of the various classes of equipment, which were available from the records, and the average life, straight line depreciation could be readily applied and the average value for each unit of equipment determined. The Washington commission believed that more accurate figures were secured in this way and at a lower cost than by other methods.

ST. LOUIS & SAN FRANCISCO RECEIVERSHIP.

THE immediate causes of the receivership of the St. Louis & San Francisco are misfortunes due to the flood and to the general state of railroad credit; the ultimate causes were financial. Unlike the case of the receivership of the Missouri Pacific, the St. L. & S. F. receivership is not due in any degree to past mistakes in the operation of the road. The St. Louis & San Francisco and its subsidiary, the Chicago & Eastern Illinois, have been and are fully maintained in accordance with the standards of the best roads in their territory. The St. L. & S. F. itself is a heavily capitalized road and in addition to this the company has assumed in the process of expansion various burdens, some of which have proved too heavy for it to carry. Most conspicuous of these burdens is that of the purchase of the Chicago & Eastern Illinois.

In 1902 the St. Louis & San Francisco offered to buy the preferred stock of the C. & E. I. for \$150 per share and the common stock for \$250 per share, and on June 30, 1912, had bought \$8,096,000 of the total outstanding \$12,146,500 preferred stock (\$3,154,500 of this preferred stock was issued in 1911-12 to stockholders of the Evansville & Terre Haute to effect the consolidation of this property with the C. & E. I.) and \$7,217,800 of the \$13,626,100 common stock, the entire remaining \$6,408,300 of common stock being deposited with the Equitable Trust Company of New York to be issued only for enlargement or improvement of the property. The St. Louis & San Francisco issued trust certificates in exchange for this C. & E. I. stock, paying on these trust certificates amounts equal to 6 per cent. on the par value of the preferred stock deposited under them and 10

per cent. on the par value of the common stock. The C. & E. I. would therefore have had to pay 6 per cent. dividends on its preferred and 10 per cent. dividends on its common to enable the St. L. & S. F. to wash the cost of carrying this investment. In the fiscal year ended June 30, 1912, however, the C. & E. I., while paying 6 per cent. on the preferred, paid but 5 per cent. on the common, which would leave a difference of \$360,890 to be made up by the St. Louis & San Francisco.

In addition to this, the St. L. & S. F. had to pay in that year from profit and loss \$903,969 deficit on the New Orleans, Texas & Mexico, beside making advances to other subsidiaries for additions and betterments, etc.

When the Chicago, Rock Island & Pacific and the St. Louis & San Francisco separated in 1910 the prospects for both roads appeared to be improved by the separation. The Rock Island, however, was not burdened with any expensive guarantees, such as that of the Frisco on the C. & E. I. stock. It was for this reason, possibly, that the C. R. I. & P. was enabled to get its money needed for improvements since 1910 at a more reasonable rate than was the Frisco. On June 30, 1912, the St. Louis & San Francisco was carrying \$12,929,615 unextinguished discount on funded debt, and the combined balance sheet of the Frisco and the C. & E. I. and New Orleans, Texas & Mexico showed loans and bills payable of \$7,459,107. The St. L. & S. F. last September sold \$2,600,000 2-year 6 per cent. secured notes, dated September 3, 1912, due September 1, 1914. These notes were offered by the company's bankers to the public at par, and presumably the money cost the Frisco well over 7 per cent. In the fiscal year ended June 30, 1912, the net increase in funded debt and equipment bonds and notes was \$7,918,907, and the increase in amount of unextinguished discount on funded debt was \$2,196,527, of which \$903,969 was charged out to profit and loss for that year and the remainder added to the amount carried on the balance sheet, the total of which at the end of the year has already been commented on.

The application for receivership of the St. Louis & San Francisco was on a bill of complaint by the North American Company, which said that the St. L. & S. F. was unable to pay \$400,000 matured notes. At the same time an application was made for the appointment of a receiver for the Chicago & Eastern Illinois. President Winchell and Thomas H. West, of the St. Louis Union Trust Company, were appointed receivers of the Frisco, and W. J. Jackson, vice-president, and Edwin W. Winter, formerly president of the Northern Pacific, and more recently president of the Brooklyn Rapid Transit, were appointed receivers of the C. & E. I. The Frisco has \$2,225,000 notes maturing on June 1, and it was apparently an absolute impossibility to sell any securities with which to refund these notes.

The receivership ended one of the gamiest fights to prevent such an outcome in the history of American railways. If hard and able work by an excellent organization could have kept these properties solvent they would have remained solvent. No railway president in the country has worked harder than Mr. Winchell has since he went to the Frisco Lines somewhat over three

years ago. He has almost lived in his car out on the line supervising personally as far as he could the operation of the properties, and contributing in a way for which he is peculiarly fitted to increasing the popularity of the Frisco Lines. The work of the traffic and operating departments separately and their team work have been admirable. On the part of the traffic department no stone has been left unturned to find and develop new sources of business. The operating department has made a fine and successful fight both to improve the service rendered and to increase the economy with which it has been rendered. The Frisco has had available very small means for improving its physical property. Nevertheless it has been well maintained, and by careful and thorough supervision its average revenue freight trainload was increased from 195 tons in 1903 to 221 tons in 1909, and to 255 tons in 1912. In spite of the relatively meager funds available many improved methods of handling business and dealing with the public have been adopted. Several of these have been described from time to time in the *Railway Age Gazette*, such as the systems of handling loss and damage claims, of moving merchandise freight and of giving station agents large authority in the handling of claims and the solicitation of traffic. It cannot be too emphatically said at this time when there might develop some misunderstanding as to the facts that the organization and personnel of the operating and traffic departments of the Chicago & Eastern Illinois and the Frisco have been exceptionally good, and that their officers have done all that men can do to prevent the result which has now come.

ACCIDENTS ON PRIVATE AND STATE RAILWAYS.

A SOCIALIST writer in a popular magazine recently has been discussing railway accidents in this country and seems to be approaching the conclusion that government ownership is the only efficient remedy for them. If the accident statistics of the railways of the United States be compared with those of the leading state railways of the world, and no other comparisons be made, the conclusion is sure to be drawn that state railway management conduces to safety. But a conclusion based on this evidence alone would be unscientific and misleading. In order to reach a sound conclusion as to whether state management is superior in respect of safety or any other matter to private management it is necessary to make comparisons of several classes. One of the most enlightening classes of comparisons is between state and private railways in the same country. The least satisfactory class of comparisons is between railways in different countries, because in different countries the conditions are apt to be quite different and may be widely different.

To ascertain whether there is any relation between state or private management and safety the *Railway Age Gazette* recently asked the Bureau of Railway Economics to compile from the official reports of the railways of a number of countries data showing the ratios of the numbers of accidents to passengers to the numbers of passengers carried, or the numbers of passengers carried one mile; and the ratios of the numbers of ac-

		Mileage.	PERSONS RESULTING FROM TRAIN OPERATION.					
			Number passengers killed.	Passengers killed per 100,000,000 pass. miles.	Number employees killed.	Number employees for one killed.	No. employees killed per 1,000,000 train miles.	Other persons killed.
Austria (Year ended December 31, 1910)—								
State railways		11,783	22	.60	93	2,409	1,0356	292
Private railways		2,353	7	.70	19	2,822	.8174	47
France (a) (Year ended December 31, 1910)—								
State railways		5,546	66	3.15	83	855	1,7032	104
Private railways		19,610	5	.06	237	1,131	1,2355	258
Sweden (Year ended December 31, 1909)—								
State railways		2,717	2	.40	21	1,188	1,5289	28
Private railways		5,735	3	.71	11	1,867	.6276	31
Switzerland (Year ended December 31, 1911)—								
State railways		1,705	12	.92	29	1,214	1,3728	45
Private railways		1,238	00	.00	2	3,269	.2611	11
Germany (Year ended March 31, 1912)—								
State railways		34,892	112	.48	554	1,273	1,2553	680
Private railways		2,216	3	.71	9	1,266	.7564	26
Canada (Includes state and private railways. Year ended June 30, 1911).....		25,400	28	1.07	227	622	2,4099	238
United States (Year ended June 30, 1911).....		243,434	556	1.07	3,163	527	2,4557	6,438

(a) Casualties to passengers include only those occurring in train accidents.

cidents to employees to the numbers of train miles run and to the total numbers of employees. The data furnished relate to countries where private management is almost the sole policy, to countries where state management is almost the sole policy, and to countries where there are both state and private management. Only statistics relating to fatalities will be given here, both because of limitations of space and because figures for injuries are compiled on varying bases in different countries. The wide discrepancy between the bases on which injuries are reported is illustrated by the fact that in the United States all employees are reported as "injured" who are incapacitated for duty more than three days out of the ten immediately following the accident; that in the United Kingdom all are reported who are incapacitated for one day; that in Germany only those are reported who are incapacitated for work for at least fourteen days; and that in France only those are reported who are incapacitated for at least twenty days. Obviously, comparisons between statistics made up on such different bases are worthless. There are also differences between the bases on which fatalities are reported, but these do not vitiate comparisons. In the table on the preceding page figures are given separately for the state and private railways of Austria, France, Sweden, Switzerland and Germany. Figures are also given for the railways of Canada and those of the United States.

In the foregoing table the unit on which comparisons of fatalities to passengers are made is the number of passengers killed for 100,000,000 passengers *carried one mile*. In several countries statistics for passengers carried one mile are not compiled, and the following table gives for the United Kingdom, Italy, New Zealand and Victoria information similar to that given for other countries in the preceding table, except that in the following table the unit on which comparisons of fatalities to passengers are based is the number of passengers killed for 100,000,000 passengers carried, regardless of the distances they were carried.

for which figures are given in the second table those of New Zealand killed more passengers in proportion than any others, their record in this respect being almost eight times as bad as that of the railways of the United Kingdom, and worse even than that of the railways of Italy. While the record of the French state railways for safety is very bad, that of the five large private railways of France is extremely good. There is close competition for first place between the private railways of France, the private railways of the United Kingdom and the state railways of Prussian-Hesse. The Austrian railways, both private and state, make nominally the best records, but probably this is largely because trains are less numerous and their speed lower in Austria than in the United Kingdom, France, Germany and the United States.

The figure in the tables which perhaps stands out the most prominently is that showing that in the year ended June 30, 1911, 6,438 "other persons" were killed on the railways of the United States. Of these, 5,284 were classified by the Interstate Commerce Commission as trespassers. Most of the rest of the "other persons" were killed in accidents at highway grade crossings. The accident record of the railways of the United States compares badly enough with those of most of the railways of other leading countries without having this large number of fatalities to trespassers, which is due to inefficient government and not to railway management, added to it.

The reader who studies the statistics on the subject with an open mind is sure to conclude that under similar conditions the accident records of state railways are certainly no better than those of private railways, and that there is no connection between state management and safety. The accident record of the railways of the United States is not due to private management, but to local conditions which the government and public must co-operate with the railway managements in dealing with if they are ever to be remedied. On the one hand, the

FATALITIES TO PASSENGERS, EMPLOYEES AND OTHER PERSONS RESULTING FROM TRAIN OPERATION.

	Mileage.	Number passengers killed.	Passengers killed per 100,000,000 pass. carried.	Number employees killed.	Number employees for one killed.	No. employees killed per 1,000,000 train miles.	Other persons killed.
United Kingdom (Private). Year ended Dec. 31, 1911.	23,417	112	8.40	430	1,416	1.003	617
Italy (State). Year ended December 31, 1909.....	8,875	43	54.38	122	1,227	1.8475	228
New Zealand *(State). Year ended March 31, 1911..	2,742	7	62.50	10	1,288	1.2283	18
Victoria (State). Year ended June 30, 1912.....	3,543	9	8.63	26	....	1.8791	32

*Includes casualties in train accidents only.

A glance at the table is sufficient to show that the accident records of Canada and the United States are relatively bad. Only a second glance is necessary to show that there is no relationship between state railway management and safety. The figures show that generally the accident records of state railways are worse than those of private railways in the same country. The proportion of passengers killed was greater on the private railways of Austria, Sweden and Germany than on the state railways of the same countries; the opposite was the case in France and Switzerland; and the proportion of employees killed was greater on the state railways than the private railways in every case. The worst record in Europe is that of the French state railways. In proportion to the number of passengers carried one mile they killed almost four times as many passengers as the railways of any other leading country of Europe, and three times as many in proportion as the railways of Canada or the United States. Nor was their record in the year for which figures are given exceptional. "The six big railway accidents which have occurred in France for the last five years have been on the state systems, three on the old system and three on the Western," said Pierre Leroy-Beaulieu, a member of the Chamber of Deputies, in a paper before the Royal Economic Society of London on January 11, 1912. Their record for killing employees is also the worst in Europe.

New Zealand has been held up by socialistic writers to the admiration of the world because of the alleged safety of its railways. It is, therefore, interesting to note that of the railways

railway managements should exhaust every resource at their command to reduce accidents. On the other hand, the government and public should give the railways a chance to earn enough money to make necessary improvements, should back them up in adopting and enforcing rules necessary for safety, should keep trespassers off their rights of way, and should then hold the railway managements up to the highest standards of public duty.

NEW BOOKS.

Safety Valve Rating. By Alfred B. Carhart, E.E. Bound in paper; 105 pages, 6 in. x 9 in.; 8 illustrations. Published by the Crosby Steam Gage & Valve Company, Boston. Copies sent free on application to Mr. Carhart at 40 Central street, Boston, Mass.

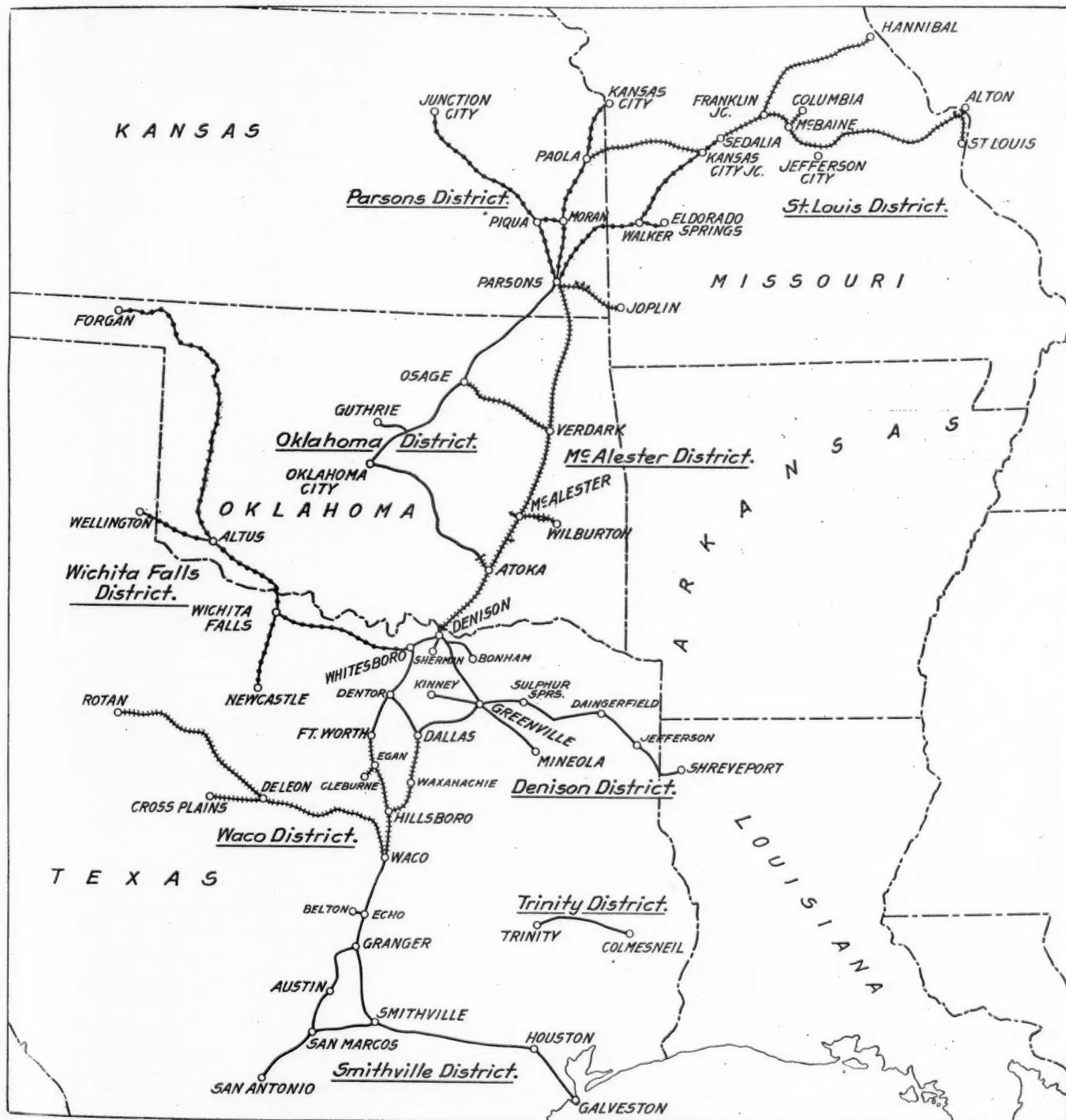
This book is intended only as an elementary discussion of the subject of safety valve rating. Three new rules are proposed and are developed one from another, all the calculations being given in detail. The preliminary discussion takes up the objections to present rules and makes comparisons between them; the subject of reduced lifts is discussed. Various considerations in safety valve design are next taken up, such as limiting the size of the valves, the disadvantages of larger valves and increased lift and the advantages of flat-seated valves. There are numerous tables included, and six appendices are given at the end of the book, dealing with such subjects as Napier's rule, formulas for flat and bevel seated valves, calculations of pressure, etc.

STUDIES IN OPERATION—THE M. K. & T.

A Substantial Reduction Made in the Transportation Ratio of the Texas Lines Without the Addition of Heavier Power.

The Missouri, Kansas & Texas operates 3,399 miles of road, of which 1,635 miles are in Texas, and few companies with lines in Texas have ever succeeded in making the operation of their Texas lines profitable. The M. K. & T. north of the Red river has for a number of years had to help bear the burden of the

operating income of \$2,973,279, as compared with \$945,841 net income for the corresponding eight months of the previous year, an increase of 214 per cent. It is proper to point out, however, that even with this extraordinary increase in net income, the Texas lines are probably not earning a fair return on the invest-



The Missouri, Kansas & Texas, Showing the Operating Divisions.

operation of the lines south. It is therefore the profitable operation of the Texas mileage which presents the most difficult problem to be solved, and in the successful solution of it lies the hope of the greatest possible development of the country and of the future prosperity of the railroad company. In the eight months ended March 31 the Texas lines showed a net

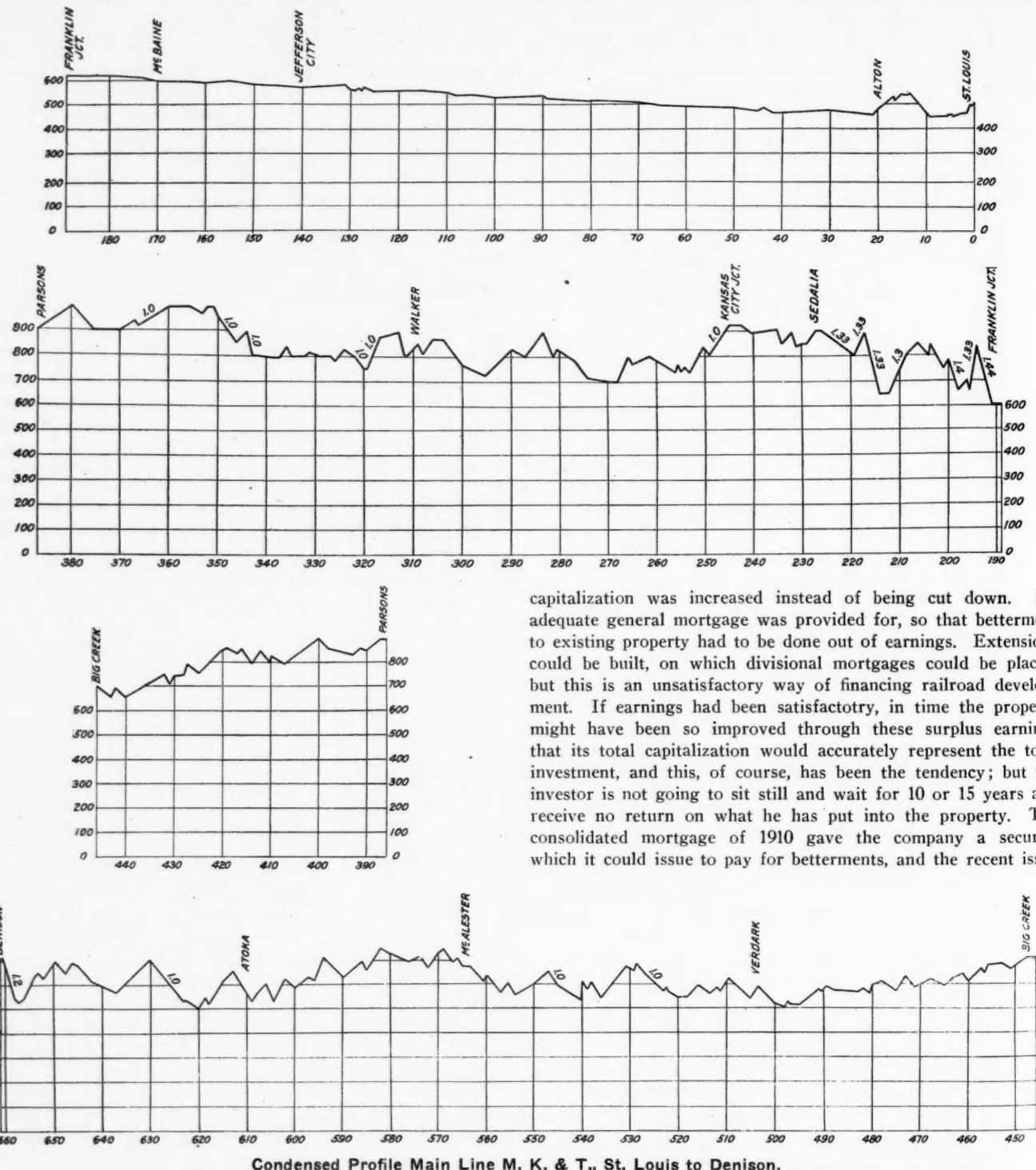
ment in them, but it is true the prospects for the Texas lines are good for the first time in the history of the company.

To adequately understand operating conditions on the M. K. & T. it is necessary to review briefly the history of the property. In 1888 the Missouri, Kansas & Texas was lost to Gould control by being placed in the hands of receivers. The Goulds

had bought or built the property piecemeal, their idea being to form a Gould system in the southwest combining the M. K. & T., the Texas & Pacific and the International & Great Northern. Some idea of the way in which the lines were put together may be suggested by the fact that the main Gould line from Chicago to Houston, Tex., was made up by using the Wabash, the M. K. & T., the Texas & Pacific, via Palestine, and the I. & G. N. At the time the Goulds had the M. K. & T., the head-

recently the Wichita Falls lines were purchased. After the termination of the receivership there was a lack of continuity of policy. At times the road was managed from New York, at other times from St. Louis. The sums required for rebuilding the lines on modern standards were so great that a sort of hand to mouth program of betterment was pursued.

The reorganization of the company in 1888 was carried through without foreclosure sale, and the somewhat top-heavy



Condensed Profile Main Line M. K. & T., St. Louis to Denison.

quarters of the company were at Palestine, Tex., which is about one hundred miles from the nearest station on the M. K. & T.

At the time of the receivership the road was quite incomplete; the receivers were given permission to make certain extensions and when the property was reorganized certain further extensions and purchases were made. The Oklahoma lines were acquired after most of the other roads had already got lines in Oklahoma. Later the Texas Central was acquired and more

of \$19,000,000 notes was secured by a deposit of these consolidated mortgage bonds. This situation has been a drawback to the company's credit, the effects of which are still shown in the prices at which its securities are selling.

The result of this kind of a history may easily be imagined. The system as a whole at the time the present management took it over about two years ago was most unevenly developed. The Texas lines especially had been inadequately developed, and

while the main line of the company north of the Red River was in fairly good shape, even here there was a considerable betterment work to be done before heavy locomotives could be put in operation. The company had a surfeit of light and obsolete power.

The M. K. & T. has had for a long time a strong traffic department. About 35 per cent. of the total operating revenue comes from passenger service, and largely through the efforts of the traffic department the "Katy" passenger service was widely known. This much the new management had as a valuable legacy from former managements.

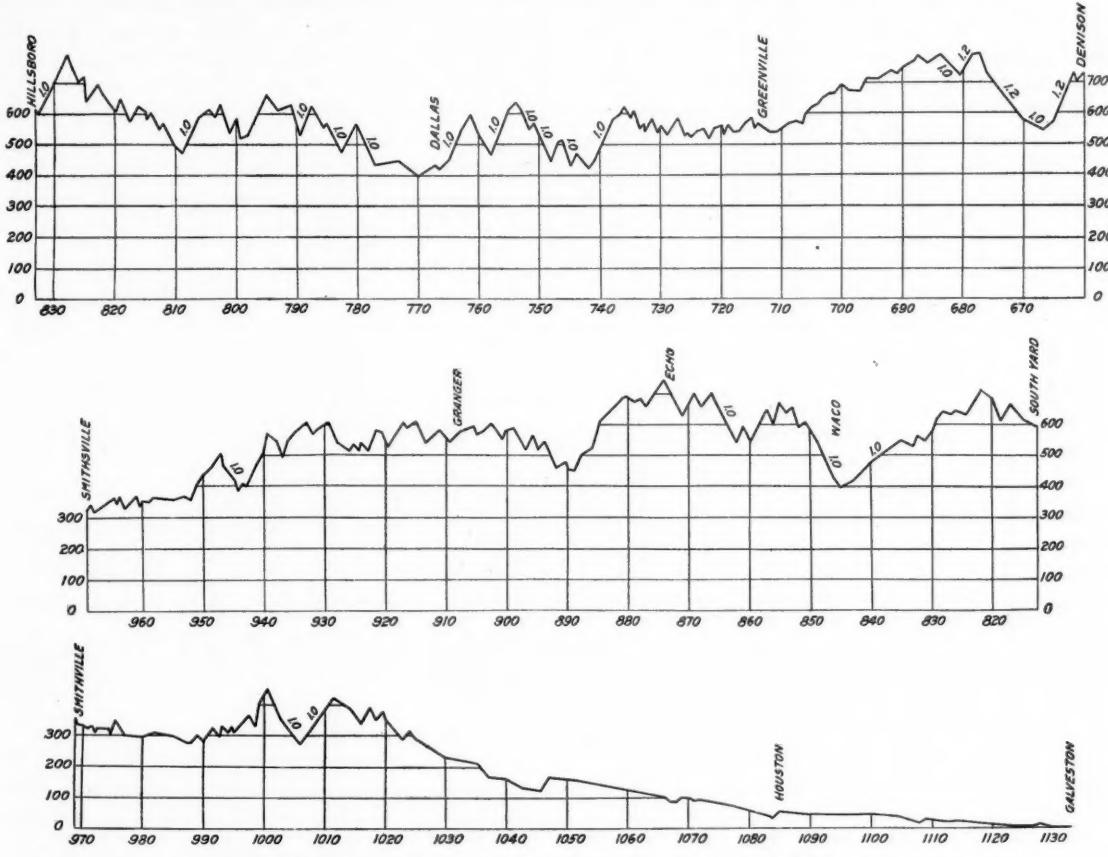
In addition to this, the road serves a territory that is developing about the most rapidly of any in the United States. While the M. K. & T. is not the short line in a single important instance, it nevertheless reaches all of the best cities in Texas and some of the best in the southwest, and now has an important and growing business in Oklahoma. Besides, however, taking a property that was unevenly developed, the new manage-

ment in Texas; the general manager is in Dallas. The accompanying diagram shows the scheme of the organization.

The lines north of Denison were divided into four divisions—the M. K. & T. calls them districts—each in charge of a superintendent, and the lines south into four, excluding the "orphan line."*

Under the former organization the superintendent had entirely lacked authority to either finally dismiss an employee or to adequately decide on increases of force. He is now given very full authority. The mechanical department had not been under the direction of the superintendent, but now the superintendent is given authority over the master mechanic and is held directly responsible for the performance of the mechanical department on his division. He likewise, as will be seen by the diagram, has jurisdiction over and is responsible for maintenance of way on his division.

The Hine system of unit organization has not been adopted in its entirety, but certain features of it are used in the divisional



Condensed Profile Main Line M. K. & T., Denison to Galveston.

ment found an operating, mechanical and engineering organization that was by no means satisfactory, and which was working under conditions often very far from modern. It is absolutely necessary to appreciate this before it is possible to understand the changes that are being made, the unsatisfactory showing that was made in the year ended June 30, 1912, and the extent of the progress in the present fiscal year.

Of course, in comparing the showing made in the first eight months of the present fiscal year with the corresponding period of the year before it should be borne in mind that the conditions in the year before were quite abnormal. It may be true, however, that in part these abnormal conditions were the result of the non-application of the very methods the application of which is meeting with so much success in the current eight months.

One of the first undertakings that the new management carried out was to give the property a strictly divisional organization. It was divided into two grand divisions; the lines north of Denison and the lines south of Denison. The new president, while making his headquarters in St. Louis, spends most of his

organization that has been adopted. There is one common division superintendent's file, and all letters, whether they pertain to the mechanical, engineering or train service departments, are kept in this file. The offices of the entire staff of the superintendent are located in the same building. The Hine distinction between line and staff officers is recognized in the M. K. & T. form of organization. Thus the chief engineer of maintenance is a staff officer of the general manager, as is also the superintendent of motive power, and in the same way the engineer of maintenance is a staff officer of the general superintendent. These changes in organization were preliminary to an effort in the direction of the most obvious possibility of economy—namely, increasing the train load.

The average revenue train load on the entire system was 241 tons in 1912, and was about 175 tons on the Missouri, Kansas & Texas of Texas. The reasons for this very low average train load were, first, that the physical condition of the property, especially in Texas, did not permit of the use of heavy modern

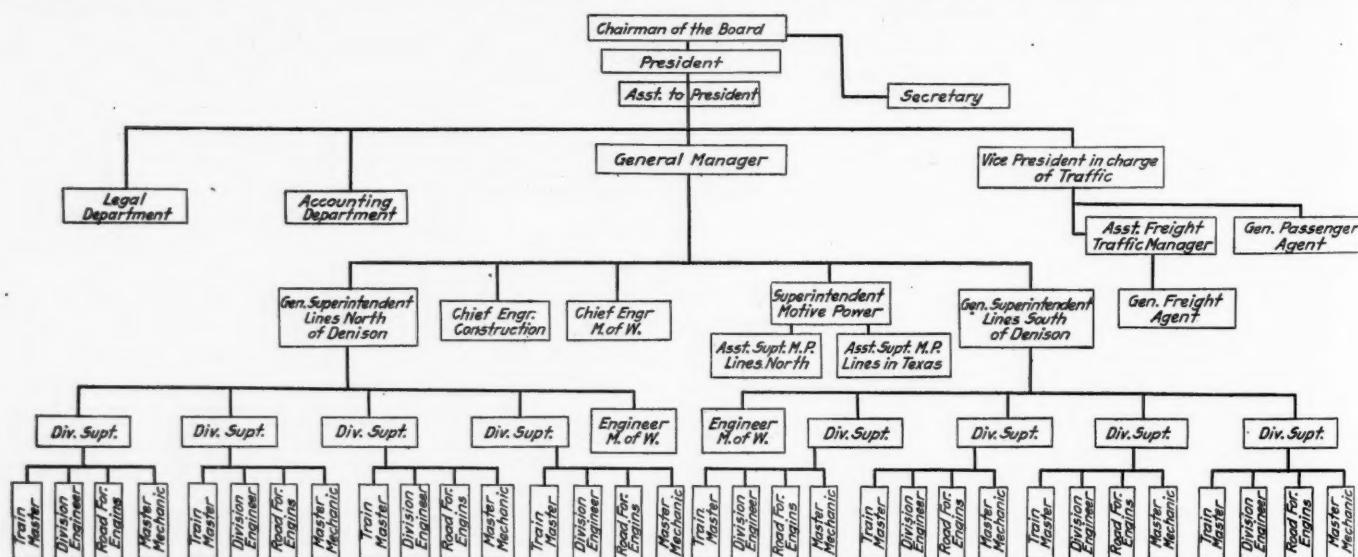
*The "orphan line" runs from Trinity, Tex., to Colmesneil.

locomotives, and even where, as on parts of the main line north of the Red River, heavy power could have been used, it was not. As will be seen from the accompanying profile, the road has heavy grades—throughout Texas the ruling grade is 1 per cent. Double-heading could not be done because in Texas the laws forbid it, and north of the river the company in the past got itself into an agreement with its employees which provided that the only double-heading which could be done was where no increase in tonnage was made to the train and a second caboose was carried. Furthermore, the nature of the traffic is such that over 40 per cent. of the total car mileage is made by empty cars and the loaded movement has necessarily to be performed at fast speeds.

Out of St. Louis the M. K. & T. gets a large and what should be a fairly profitable merchandise business. Since, however, this business is highly competitive, the movement of it must be rapid and prompt. For example, there are from two to four through freights run south out of St. Louis each evening. The nature of the St. Louis division is such that it would be perfectly possible to operate considerable heavier locomotives; but, since to get the business at all the first train of merchandise must be started from St. Louis by about eight o'clock p. m., regardless of whether or not even a light engine has its full

runs from Trinity, Tex., to Colmesneil, lies in the heart of the timber country of East Texas. Arrangements are now being made for a line connecting this "orphan line" with the main line. The installation of the divisional form of organization has already been mentioned. The next step was the preparation of the physical property for the use of heavier power. Fifty Mikado locomotives were ordered, ten of which are to be placed in operation from Waco, Tex., to Smithville, and the remainder on the main line from Sedalia, Mo., via Parsons, Kans., and McAlester, Okla., to Denison, Tex. The bridges on the line on which heavier power was to be installed were immediately renewed where necessary with steel or concrete structures, and 60 and 66-pound rails were taken out and replaced with 85-pound rail. A five-year program was started of replacement of chatts ballast with stone ballast on the main line north of the Red River, and an immediate beginning was made on the lines in Texas in strengthening the burnt clay ballast that is used in this territory. An eight-year program of renewing all wooden bridges on the main line with permanent structures of concrete or steel has been commenced.

There are two classes of freight locomotives in service at present for main line work. These are what are called 30 per cent. and 41 per cent. engines, the first class having 30,000 lbs.



The Divisional Form of Organization on the Missouri, Kansas & Texas.

rating, no gain can apparently be made by assigning to this division heavier power. By eleven o'clock or so a train load of manufactures, beer, etc., is ready to move, and possibly an hour or so later a second train of merchandise.

The merchandise movement over the entire system is almost without exception southbound and must, of course, be loaded in box cars. The north-bound movement at present consists principally of cattle, fruit and vegetables. The cattle are loaded in stock cars, the fruit and vegetables in refrigerator cars. The principal coal fields on the M. K. & T. are in the neighborhood of McAlester, Okla., and a quite heavy movement of coal is shipped down into Texas. At present there is no north-bound lading for the coal cars. There is no south-bound lading for the refrigerator and stock cars and there is a comparatively small north-bound lading for the box cars in which merchandise has been shipped south. The cotton movement, which is presumably the most profitable traffic which the M. K. & T. has, nearly all moves in four months of the year, beginning in August, and this also is a south-bound movement unbalanced by any north-bound traffic.

When Mr. Schaff became president, one of his first undertakings was to lay the foundation for the development of a slow north-bound traffic. On the M. K. & T. proper there is now almost no timber, but the so-called "orphan line" which

tractive effort and a total weight of 152,000 lbs., and the second class having a tractive effort of 41,000 lbs. and a total weight of about 200,000 lbs. On the main line of the St. Louis division 30 per cent. locomotives are in use and have a rating of 1,850 tons, except between New Franklin and Sedalia, Mo., where to get this rating it is necessary to double-head. From Sedalia to Denison the 41 per cent. engines are in use, with the following rating:

Sedalia to Parsons.....	1,521 tons
Kansas City to Parsons.....	1,215 tons
Parsons to North Wagoner.....	1,960 tons
North Wagoner to North McAlester.....	1,570 tons
North McAlester to Atoka.....	1,800 tons
Atoka to Denison.....	2,620 tons

The new Mikado locomotives which are being put in service have a tractive effort of 53,000 lbs., and it is estimated that their rating will be about 38 per cent. greater than that of the old 41 per cent. engines. The rating of the 41 per cent. engines and 30 per cent. engines in Texas is shown in the following table:

From	To	Per cent. engine	Tonnage rating
Denison	Fort Worth	30	870
Denison	Fort Worth	41	1,180
Fort Worth.....	Hillsboro	30	1,045
Fort Worth.....	Hillsboro	41	1,425
Denison	Dallas	30	985
Denison	Dallas	41	1,340
Dallas	Hillsboro	30	900
Dallas	Hillsboro	41	1,230

From	To	Per cent. engine.	Tonnage rating.
Hillsboro	Waco	30	960
Hillsboro	Waco	41	1,310
Waco	Smithville	30	960
Waco	Smithville	41	1,310
Smithville	Houston	30	980
Smithville	Houston	41	1,330

The heavier power is just now arriving, but in the year and a half in which the present management has had the property, operating conditions have changed to an extent that is really remarkable because it is not due to heavier power, but to other activities.

Without doubt the single most important change that was made was that of organization. The concentration of authority and responsibility in the superintendent was a long step in itself; the establishment of the company's headquarters in Texas was a recognition of the tremendous possibilities of the country served by the M. K. & T. in that state. There were a thousand other changes made, possibly the great majority of them nothing more than the establishment of generally accepted modern operating methods, the net results of which, however, are quite strikingly shown in the two accompanying tables of figures for the lines in Texas.

M. K. & T. Ry. Co. of Texas.

Month.	Total operating revenue	Total operating expenses	Ratio total op. exp. to total op. rev.		Trans- portation expenses	trans. exp. to total income expenses	operating expenses op. rev. (or loss)	Net operating (or loss)
			115.0	59.90				
July	\$719,264	\$827,146	115.0	59.90	\$429,709	59.90	-\$107,882	
August	888,145	764,802	86.11	402,038	44.96	123,343		
September...	1,125,131	816,855	72.60	446,788	39.47	308,275		
October....	1,297,305	864,170	66.61	514,083	39.63	433,134		
November...	1,193,824	960,440	80.45	583,638	49.00	233,384		
December...	1,069,987	983,085	91.88	586,757	54.80	86,902		
1912.								
January	854,037	920,099	107.74	556,853	65.2	-\$66,061		
February ...	810,197	811,623	100.17	520,165	64.2	-\$1,426		
March	719,280	783,109	108.88	490,889	68.2	-\$63,828		
Total	\$8,677,170	\$7,731,329	89.03	\$4,530,920	52.22	\$945,841		
1913.								
July	\$853,253	\$768,160	90.03	\$418,708	49.1	\$85,092		
August	1,072,931	721,915	67.28	430,870	40.1	351,016		
September...	1,320,395	791,878	59.97	478,768	36.2	528,517		
October....	1,596,685	871,143	54.56	552,647	34.7	725,542		
November...	1,460,433	879,790	60.24	569,122	38.9	580,642		
December...	1,233,529	875,507	70.98	556,147	45.08	358,022		
Total	\$10,580,547	\$7,607,264	72.09	\$4,656,753	44.01	\$2,973,279		

REVENUE TONS STATISTICS.

Month.	Texas Company.			
	1911-1912.	1912-1913.		
	Rev. tons per train mile.	Rev. & Co. tons per train mile.	Rev. tons per loaded car mile.	Rev. & Co. tons per L. C. mile.
	Rev. tons per train mile.	Rev. & Co. tons per train mile.	Rev. tons per loaded car mile.	Rev. & Co. tons per L. C. mile.
July....	109.84	144.67	12.28	16.17
Aug....	170.65	226.01	11.10	17.13
Sept....	209.47	246.23	13.68	16.08
Oct....	203.12	229.97	13.40	15.17
Nov....	187.80	215.12	13.44	15.39
Dec....	167.27	194.39	12.70	14.76
Jan....	187.43	222.40	14.55	17.27
Feb....	166.14	214.84	12.71	16.43
	Rev. tons per train mile.	Rev. & Co. tons per train mile.	Rev. tons per loaded car mile.	Rev. & Co. tons per L. C. mile.
	Rev. tons per train mile.	Rev. & Co. tons per train mile.	Rev. tons per loaded car mile.	Rev. & Co. tons per L. C. mile.
July....	181.00	232.29	13.28	17.04
Aug....	174.26	225.16	11.72	15.15
Sept....	214.21	243.37	14.51	16.49
Oct....	238.27	262.20	14.88	16.38
Nov....	224.22	253.73	14.35	16.23
Dec....	194.62	221.55	13.81	15.72
Jan....	199.22	225.72	14.89	16.88
Feb....	195.11	236.93	14.86	18.04

Some of the changes made in operating methods are worth mentioning. It had been the practice to do part of the local business with the through freight trains in an attempt to give the through trains their full rating, but with the result that through trains were anywhere from twelve to twenty-four hours late arriving at destination. Instructions were issued to use through trains for through business only, all local work, which on the M. K. & T., as on most other roads, amounts largely to a switching business, is done by local crews and carried in local trains. A somewhat similar idea was carried out in passenger service. In the first place the schedules were re-adjusted, so that it was possible, under the proper operating conditions, for

all passenger trains to be on time. Additional local trains were put on, running a certain distance ahead of the two fast through trains. The result was that the local service was improved and that the through service was brought up to a standard never before considered possible. At present about 95 per cent. of all passenger trains are on time at destination. The saving made in overtime has been remarkable.

It had been the practice to load north-bound freight into the first available car without any regard for car-loading, since there was a great surplus of empty cars moving north in any case. Instructions have now been issued to devote as much care to full car-loading north-bound as south-bound. Full trains of empty cars are run north-bound and the surplus locomotive and caboose is run north as the first section of the passenger train. Here again the saving in overtime has been remarkable. Company freight which had been moved indiscriminately in revenue freight trains is now moved in revenue trains *only*, where a distinct advantage can be gained by filling out a train's tonnage rating.

At many places on the M. K. & T. the water is not good. A chemist has been engaged and a comprehensive study of water conditions is now being made. Good results are already being obtained by the use of compounds for water treatment at numerous places, especially in Texas.

It used to take from two to four months for the traffic department to explain away the delays to shipments during the four rush months, August to December. The handling of cotton for export shipment is a service that requires a great degree of accuracy, but one which is handled under very heavy pressure. A system of notification of shippers as to the progress of their shipments has been inaugurated. A careful record of rush traffic is kept in one general office of the shipments all over the line. Shippers, therefore, can find out at any time just where their goods are and what are the prospects of delivery within any specified time. A system has just been started of sending cotton waybills on to Galveston, Tex., by train mail, so that expense bills may be made up for them before the arrival of the cars containing the shipments. Under this system, of course, cars move on card waybills. In this way notification of the arrival of a shipment of cotton and the bill of lading covering such shipment can be delivered to the consignee literally within a few minutes of the arrival of the car at Galveston. The importance of such service lies in the fact that cotton is sold very often at a price which is the current quotation in Galveston at the time of the arrival of the shipment. A question of minutes, therefore, may be of considerable importance.

It has been found that heavy movement can be materially facilitated and congestion avoided by moving cotton trains in fleets.

The make-up of trains in the yards has been studied with a view to economical operation of the whole system. Yard masters who previously made up trains without any apparent knowledge of how the cars were to be handled at destination points, are now instructed so that the train is made up in a way which will avoid as far as possible switching at way stations or destination. As a matter of fact, this studying of the needs of the system as a whole and the adaptation of local conditions to these needs has been almost as important a factor in the improvement of operating conditions as the change to a logical divisional organization. Before the present management took over the property, division superintendents received no monthly earnings' statements, and this was characteristic of the lack of co-operation between the different parts of the system.

A material reduction is being made in the operating ratio, and yet considerable increases in many instances are being made in operating forces; where heretofore there were two road foremen of engines, there are now eleven; where heretofore it took an agent three to four months to get authority to make an addition to his forces, he can now make that addition on his own authority and is then called on to justify such an addition.

Labor conditions are probably the hardest problem that the

M. K. & T. has to face. In the past public opinion and legislative activities in Texas were violently anti-railroad—but in 1912 Texas was almost the only state in the Union that passed no adverse railroad legislation. This matter therefore—adverse legislation—appears to be getting better, but the labor problem remains. With a business that varies so widely in volume as between different seasons, the M. K. & T. in Texas is to a certain extent at the mercy of a floating class of very undesirable employees. There has been a spirit of insubordination, a disregard of rules, a lack of loyalty that has hurt all of the railroads in Texas to a marked degree. The lack of authority given to superintendents and the sort of hopeless attitude which was taken toward the operation of the Texas lines of the M. K. & T. at various times in the past history of the road did nothing to better this condition. Naturally with a stronger and firmer administration there was engendered a certain hostility, especially among the rougher elements of the employees, on which the company is dependent to some extent for its trainmen. The hope of the company to better this condition lies largely in the possibilities, first, of educating public opinion; second, of opening a future for steady and profitable employment to the younger generation of men who are growing up along its own line. The difficulty is that the railroad company has to compete so strongly with other industries in a new and rapidly developing country where both labor and capital are at a premium. A strong administration which will hold out a prospect of permanent employment, of fair treatment, and of chances for advancement for those who show loyalty to it, is the one hope of a railroad situated in that part of Texas through which the Missouri, Kansas & Texas runs. The things that are being done to improve operating conditions suggest such an administration. Coupled with this is a certain cheerful optimism that it would seem in the long run would be bound to have its effect from the top to the bottom of the organization. On the lines north there is now a fair degree of esprit de corps. For instance, Parsons is a railroad town almost pure and simple, and it is a "Katy" town.

It would seem that in the long run if a permanent organization can be built up, fair treatment, optimism and success should be sure of permeating down through the rank and file until it builds up that asset which is so essential to the operation of any railroad, a loyalty to the company. In the year and a half that the new management has been operating the property it would be foolish to expect that such results could be completely accomplished. It is true, however, that a substantial start has been made in this direction. Western men are quick to recognize efficiency, especially efficiency that is practical rather than theoretical. Success in the West is given a value even greater possibly than it has in the East. The showing that is being made on the Texas lines stands a fair chance of cumulative effect. Of course, there is always the danger of adverse and hostile legislation which may be brought to bear against any corporation which is making a success in Texas. But if the M. K. & T. can get with it the imagination and the good feeling of the best class of people whom it serves, and this is the class that the present management is aiming its service at, it should have a strong weapon with which to fight class agitators and professional demagogues.

This is a far more serious problem than that of building up the physical condition of the property. Credit is quickly sensitive to success and the adoption of modern methods in railroading are meeting with success on the M. K. & T. It remains to be seen, however, whether those who are to benefit the most by such a development as is being carried out on these lines will be as quick to appreciate the advantages that will accrue to them from such a change. The possibilities of the Southwest, the fertility of the black land belt of Texas, the increase in land values, the remarkable crops of this section have so often been described that it seems superfluous almost to mention them here. Rich as is the yield of this black belt of Texas, only a fraction of the possibilities of the country have as yet been

realized. It is this fact which is the justification for the expenditure of the very considerable sums which the Missouri, Kansas & Texas is putting into its property in the way of additions and betterments. As long, however, as the operating ratio of the lines in Texas remained in the neighborhood of ninety per cent., the railroad failed to share in the growing prosperity of the country.

The operating problem of the Missouri, Kansas & Texas is like that of every other road, intimately connected with its traffic conditions, but on the M. K. & T. to a rather unusual degree operating conditions depend, and with them the prosperity of the territory served, on the support which the management can elicit from its own employees and from the people whom it serves.

The operating methods that are being introduced are not new; they are based simply on standard practice, as it has been developed on other roads; but the conditions and luckily also the possibilities, are quite unusual. It is not difficult for a man to figure out with a fair degree of accuracy what would be the result in dollars and cents of a reduction of grades, of the introduction of heavier locomotives, of the development of the traffic which will tend to eliminate empty car mileage, but it is a far nicer problem and one requiring an unusual degree both of patience and determination to introduce modern methods on a road which has heretofore been operated under an entirely different theory. This is the operating problem which is being solved by the M. K. & T.

INSTITUTE OF CONSULTING ENGINEERS CONSIDERS VALUATION.

A special meeting of the American Institute of Consulting Engineers was held at the Engineers' Club, New York, on Thursday evening, May 22, to discuss the subject of railway valuation. About 25 members and guests were present and participated in the discussion. As this association is composed of the leading consulting engineers of the country, who are free from affiliations with either of the parties primarily interested in the forthcoming valuation, it is in position to view the subject from an unbiased standpoint. The discussion was for the most part general in nature, dealing with the broader principles which should govern rather than with the smaller problems of a direct engineering nature. The need for a very careful and thorough appraisal as a means of protection to the public, investors and railways alike was strongly emphasized, and the point was urged that the best talent available should be secured to carry out the work. In view of the vast interests at stake it was the consensus of opinion that no one of less experience than the chief engineer of a road should be called on to pass upon the estimates and appraisals made by that officer. There was also a feeling expressed by several speakers that the making of this national valuation was the first step in the government ownership of the railways.

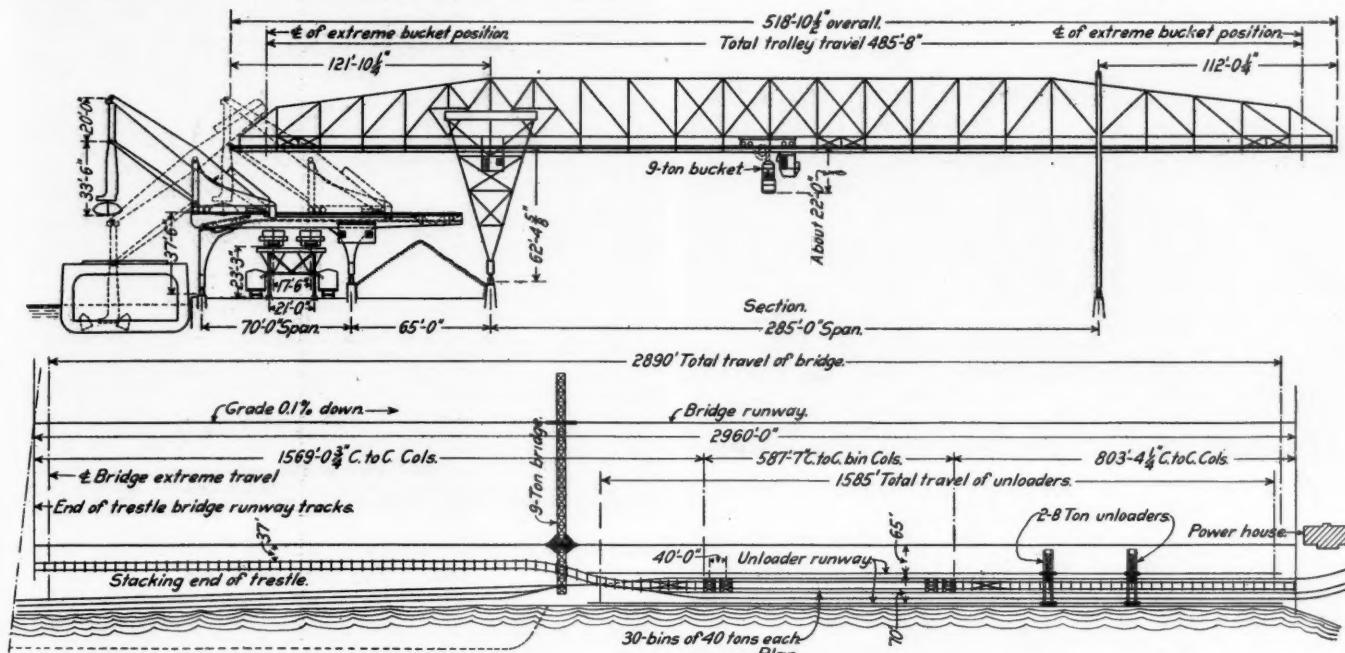
Much interest was added to the meeting by the presence of Jean de Pulligny, chief engineer of the department of public works of France, who stated that the French railways, both government and private, have been valued for 60 years. In this case, however, the original cost or book value only is considered. The first cost of construction has been kept as various roads have been built and this cost has been increased from time to time by that portion of the cost of improvements which should be charged to capital account. No account is here taken of any increase in land or other values not represented by an actual outlay of capital. As the government guarantees a fixed rate of earnings upon this book value of the property it has worked out satisfactorily in that country. These valuations are kept up by engineers of the same education and experience as the chief engineers with whom they come in contact.

CANADIAN PACIFIC COAL UNLOADING DOCK.

New Plant Located at Ft. William, Ont., Having Large Capacity and Differing Radically from Designs Commonly Used.

A coal unloading plant has recently been installed by the Canadian Pacific at Fort William, Ont., which is essentially different from the plants commonly used for handling coal. The unloading equipment is similar to that used in some of the most recent designs of ore unloading plants at lower lake

ports used on the unloaders have a capacity of eight tons, and those in the transfer and rehandling bridge nine tons, while in coal unloading plants of the more common type, 5.5 tons is about the largest bucket that is used. It is not expected that coal will be broken as badly with this equipment as is usual



Sectional Elevation and Plan of Canadian Pacific Coal Unloading Dock.

ports, and as this dock is designed to unload coal from the same boats that carry ore down the lakes, there is no reason to believe that the type of plant which has so successfully handled ore will not also serve with satisfaction for coal. The principal features which distinguish this new dock are the

in the smaller plants, since the amount of coal that comes in contact with the crushing edge of a large bucket is much less than when the same amount is handled in smaller units. The buckets are in two parts, being of the same general design as those used for handling ore, although slightly modified to allow



General View of Dock Soon After It Was Placed in Service.

provision that has been made for expansion and the use of extremely large buckets for handling the coal. The plant has been located on a low marshy island opposite the city of Fort William at the Canadian head of the lakes where there will be abundant room for any amount of expansion desired. Two movable bridges are being built to reach the island. The buck-

coal to flow freely from both ends when the halves are forced together, thus preventing the crushing of coal against the top of the bucket.

UNLOADING EQUIPMENT.

The river channel from the lake has been dredged by the government to a depth of 27 ft. and a width of 400 ft. The

face of the dock along which boats can anchor is a little less than 1,600 ft. long. There are three of the Hulett unloaders serving this dock face, which have a travel of 1,585 ft. These unloaders are carried on steel structures weighing about 600 tons and having a span of 70 ft. between runway tracks. The walking beam carrying the bucket is operated over a track on the framework of the unloader, the bucket leg being suspended from the outer end of the walking beam and so arranged that



Looking East from Unloader During Construction, Showing Bins and Larry Cars.

it can reach all parts of the hold of a vessel. The man who operates the bucket is located inside the bucket leg, allowing him to get a good view of the work at all times.

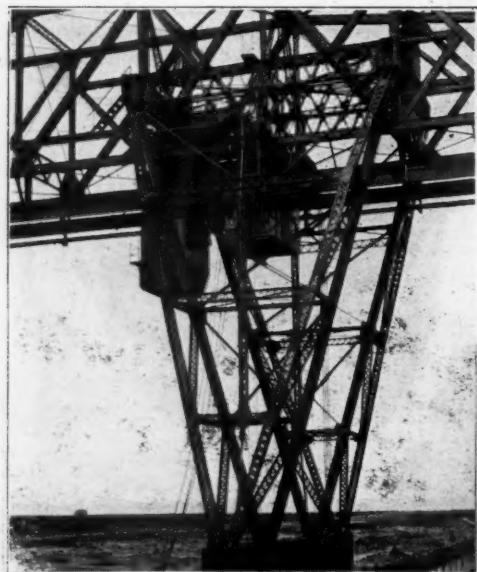
The coal is dumped by the unloader bucket into a conveyor car, also supported from the framework of the unloader and operated by a man in a cab at the rear end of each machine who also directs the travel of the whole machine along the face

scale beam is located in the operator's cab at one end of the car. It records the weight automatically so that the operator has no calculations to make. Coal is discharged from these cars through undercut gates operated by air cylinders, the controlling valve being located in the operator's cab and air

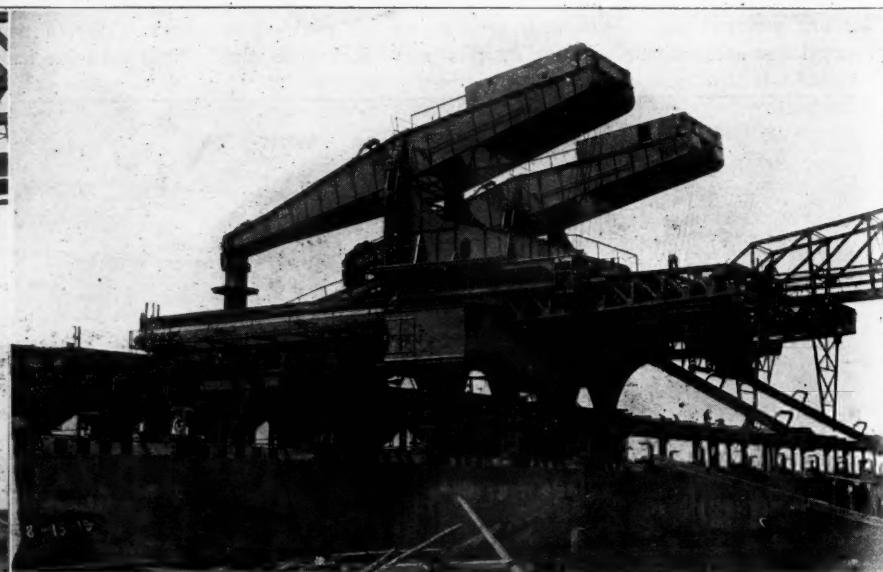


Looking West from Unloader During Construction, Showing Trestle and Storage Space.

being supplied from a small compressor hung beneath the car body. At the rear end of each unloader a movable chute is provided, into which the coal for the temporary storage pile can be dumped to prevent the breakage of coal so discharged. This chute can be adjusted to suit the natural flow of the coal



Operating Leg of Transfer Bridge.

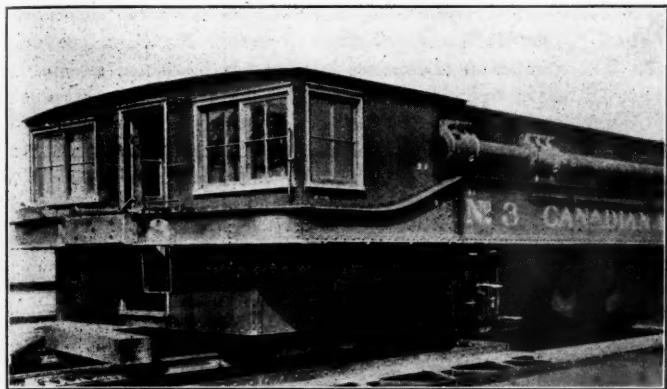


The Two Hulett Unloaders and Some of the Coal Hoppers.

of the dock. The conveyor car is built in the form of a steel bin which can be discharged in any position on its runway. Each conveyor car has a capacity of two buckets of coal. These conveyor cars are dumped either into scale larry cars running over the loading bins under the main span of the unloader or into a temporary storage pile under the rear cantilever arm of the unloader. The larry cars are low, flat cars of 35 tons capacity, consisting of a double hopper carried on scales. The

on the pile, having a telescope arrangement to allow it to be raised as the height of the pile increases. The transfer bridge spanning the main storage ground back of the unloaders has a total length of 518 ft., 10.5 in., the span between runway tracks being 285 ft. The nine ton bucket which is operated on this bridge has a total travel of 485 ft. 8 in., and the bridge itself can move 2,890 ft. along the runways. Additional storage space can easily be secured by extending this travel if necessary.

The unloaders are carried on three 4-wheel trucks under each tower, the wheels being 24 in. in diameter and 24 in. gage. The main tower of the transfer bridge is carried on four 4-wheel equalized trucks, all wheels having a diameter of 30 in., and the trucks having a gage of 36 in. center to center of wheels. The two end trucks are drivers and the two interior ones idlers. The shear leg of the bridge has a 4-wheel equalized transfer truck at each end and a 4-wheel spring idler truck in the middle. The wheels in these trucks also have a 30 in. gage. The maximum moving load per wheel on the unloader trucks is 45,000 lbs., and the maximum standing load per wheel is 70,000 lbs. The same standing load per wheel is maximum for the trucks under the transfer bridge. The maximum moving load for the bridge is 58,000 lbs. on each tower wheel and



The Operating End of One of the Larry Cars.

50,000 lbs. each for the wheels under the shear leg. The tracks supporting both the unloaders and the transfer bridge are laid with 100-lb. rails on tie plates and secured with screw spikes. The third rail for power is of 85-lb. section in both cases. The unloader runways are level, but the tracks under the transfer bridge are on a grade of about 0.1 per cent.

LOADING AND STORAGE EQUIPMENT.

As the country served by the Canadian Pacific is agricultural, a very large proportion of the company's freight equipment consists of box cars, making it necessary to utilize these cars for hauling coal from the head of the lakes back to the western

provinces. With the facilities that have been at hand for loading coal into box cars, the percentage of full capacity loads was too low, resulting in a very considerable loss in revenue. It was one of the requirements, therefore, in the design of the new plant that it be capable of rapidly and accurately loading box cars to the maximum tonnage. This feature of the plant has been very carefully worked out and the problem has been solved successfully. When cars are being loaded directly from boats, the coal is taken out of the boats by the unloader buckets, deposited near the face of the dock in the conveyor car which travels back on the framework of the unloader and dumps the coal into one of the scale larry cars running over the loading bins. There are 30 of these steel bins arranged in two rows of 15 each and spaced 40 ft. center to center. The amount of coal placed in each bin is accurately regulated by the scale car, the practice being to load each bin with the capacity of a given car which is waiting in a string of empties in the adjacent yard. In order to do this rapidly, a man in the yard checks the capacities and numbers the 15 empties and gives the list to the operators on the dock, who follow it in loading the 15 bins in one row. When this string of 15 empties is spotted alongside the bins loaded for them, each car receives its maximum tonnage by simply emptying all the bins and there is no loss of time in trimming or weighing. When box cars are being loaded, Christy loaders are used which are of a special design for this plant. These loaders operate on runways under the trestle supporting the bins, the supporting carriage being so arranged that each loader can be shifted from side to side so as to operate under either row of bins. It is driven by a single motor equipment in either of these positions. Two loaders are provided so that when a string of empties on one side of the trestle is to be loaded, one loader starts working at each end of the string and loads the cars successively towards the middle. While the loading is going on on one side, the loads on the other side are being pulled out, the bins refilled and another string of empties spotted, so that when the loaders finish on one side they are shifted over under the other row of bins and can load from the middle toward both ends. This makes the loading process continuous and eliminates all needless waste of time.

If coal is not needed for immediate shipment when a boat comes in, the conveyor cars, instead of being dumped into the larry cars, are run back onto the cantilever arm of the unloader structure and the coal is dumped into the temporary storage pile between the rear unloader runway and the front transfer



Unloaders in Operation.

bridge runway. It is picked up from this pile by the transfer bridge bucket and deposited wherever desired in the main storage pile under the transfer bridge. The cross section of the temporary storage pile into which the unloaders can dump the coal is equal to that of any of the boats in this service, so that a boat can be unloaded into this temporary pile without any unnecessary movements of the unloader along the dock face.

When it is desired to load cars from the storage piles, the nine ton bucket operating on the transfer bridge picks up the coal from the pile and dumps it directly into the larry cars. The trestle on which the larry cars operate is continued alongside the transfer bridge runway beyond the end of the dock face in order that these cars may be loaded by the transfer bridge without unnecessary movements of the entire bridge. The trestle is equipped with two sets of crossovers so that the larry cars can be transferred from one track to another and kept in continuous operation.

Cars intended for loading at the dock are brought from Fort William around the north side of the storage ground and into the plant at the east end. A through track is provided along the face of the dock adjacent to the loading track, which provides access to a three track gravity yard located west of the face of the dock. From this yard cars can be run at will in strings of 15 or less and spotted at the loading bins by car hauls running the length of the dock adjacent to each loading track. After being loaded the cars are hauled to the east end of the dock from which they are handled by switch engines.

A large part of the preliminary work of construction was done during the season of 1911 and work was carried on through the winter of 1911-1912. The site was cleared in June, 1911, and excavations for the foundations were begun about August 1. Placing of concrete was begun about the first of October and was carried through the winter, sometimes at temperatures as low as 40 deg. below zero. All concrete work was of mass design and ample precautions were taken to prevent freezing. In order to raise the level of the ground which will be used for storage, considerable material from the hydraulic dredges in the channel leading to the dock was used for filling. The problem of getting material to the work was a very difficult one at certain stages. There was then no rail connection with the island except by car ferry, and it was necessary to transport the heavy structural members used in the unloading plant across the river on a ferry which had a capacity of only one car. During the closed season for navigation, a temporary trestle was thrown across the river between Fort William and the island, and some equipment was hauled in over this.

The construction of this plant has been handled under the direction of J. G. Sullivan, chief engineer of the western lines; Frank Lee, principal assistant engineer, and D. C. Chisholm, resident engineer at Fort William. The Wellman-Seaver-Morgan Company, Cleveland, Ohio, had the contract for the coal handling plant; Amos Harned being the contractor's superintendent on the work.

USE OF TELEPHONES ON THE PENNSYLVANIA RAILROAD.*

The first use of the telephone for despatching trains on the Pennsylvania was in 1897 on the South Fork branch, 32 miles long. At that time the number of trains was four a day, but for the last ten years the average movement is eighty trains a day; and there has been no accident due to any misunderstanding of orders. The Pennsylvania now uses 17,000 telephones; some of them owned and others leased.

In the preparation of this paper, there was secured information from 35 prominent roads (not including the Pennsyl-

*Abstract of a paper by J. C. Johnson, superintendent of telegraph of the Pennsylvania Railroad, read at the annual meeting of the Association of Railway Telegraph Superintendents at St. Louis, Mo., May 20.

vania) operating 115,000 miles of line, and the statistics obtained from these different companies is summarized. Much of the information given is of the same character as that recently published by the Interstate Commerce Commission. Other facts of interest are as follows:

Average number of train orders sent per day over each despatcher's circuit by telephone, 77.2; average on telegraph circuits, 56.6; number of cases of trouble per month per 100 instruments on telephone lines, 8; number of cases of trouble on telegraph lines, per 100 instruments, 9. Reporting as to the efficiency of lines, the average efficiency is 94.3 on telephone lines and 72.8 on telegraph lines; this being taken as evidence of the well understood fact that telephone lines are less troubled than the telegraph by bad weather. The 35 companies report about 1,000 portable telephones in use, as follows: On freight trains, 268; on wrecking and work trains, 386; on passenger trains, 150; in the hands of track foremen, 20; miscellaneous, 168. The number of telephones in boxes or booths at sidings is given as 5,255; number at automatic signals, 206.

On the Pennsylvania Mr. Johnson's inquiries show the following averages: Average cost of a way station installation, \$128; average number of train orders per despatcher's circuit, per day, on single track lines, 32. The efficiency of telephone lines is impaired by bad weather 5 per cent.; of telegraph lines by bad weather, 17 per cent. The number of portable telephones on wreck and work trains is 107; on passenger trains, 4; in the hands of track foremen, 138; miscellaneous, 47. Mr. Johnson estimates that the efficiency of wrecking trains is increased by the use of the telephone 45 per cent.; of work trains, 40 per cent.; of passenger trains, 45 per cent., and of track foremen, 45 per cent. The number of telephones in boxes or booths at sidings is 2,081; number at automatic block signals, 312, and at intermediate points along the road, not previously included, 931.

On nine out of twenty-three divisions of the Pennsylvania the telegraph is kept in service for emergency use, after the telephone is installed. There has been no reduction in the number of telegraph operators at small stations. Explaining an apparently higher cost of installations on the Pennsylvania as compared with other roads, it is stated that emergency equipment is maintained at most or all of the stations; test panels are also freely installed, so as to facilitate patching of wires when necessary. The small number of orders issued by the despatchers of the Pennsylvania is explained as probably due to the extensive use of automatic block signals. Telephones at outlying points along the road have been found of great value. A standard shelter box has been devised, the door of which, hinged at the top serves, when open, to protect the user of the telephone from rain or snow.

A special wall telephone has been developed for installation in the shelter boxes and booths which is expected to give excellent results. It is equipped with an insulated transmitter and all exposed metal parts are insulated, including the generator crank, switch hook and transmitter. The receiver has concealed binding posts. The windings of the receiver, induction coil, ringer and generator-armature and cords are given a special moisture-proof treatment. Exposed metal parts which are ordinarily nickelized will be finished in a dull black.

Mr. Johnson says that on the Pennsylvania, as on other roads, an accurate estimate of the saving made by the introduction of telephones is difficult to get at, although the importance of the saving is universally recognized. The Great Northern reports that the acceleration of train movements since the use of the telephone has produced a saving of \$85,100 a year.

Mr. Johnson thinks that there has now been sufficient experience with telephone apparatus to warrant action looking to standardization of equipment. Concerning loud speaking receivers he says: "We have conducted some experiments with loud speaking receivers with a view to relieving the despatcher of the burdensome head receiver and providing him with a substitute to use during lightning storms. The snapping or crackling noises of static discharges during these storms become very

annoying with the standard head equipment, and while it may not be altogether dangerous, it is at least objectionable. It is possible that some of the despatchers have expected too much from the use of the loud speaking receiver, and have thought that it should be readily heard when they are some distance from it, instead of arranging the receiver to be heard at a distance of about 6 in. or a foot from the ear when the operator is directly in line with it. There is quite a field for development in this particular part of the apparatus, and we are confident that something will eventually be developed along this line which will be the solution."

The Pennsylvania is considering the installation of underground cables for emergency use. With such a cable looped into every station and signal station the road could cope with any adverse weather conditions. In station offices arms or brackets to hold the telephones are found of great value. The cost of maintenance of cords is reduced, the telephone is less disturbed by local noises, telephones do not get knocked off the desk, and with a head receiver the operator is free to use both hands for other work. The Pennsylvania has telephones on some of its limited trains, and also on its private cars, for use while lying at large terminal stations.

At certain points along the road five-pair emergency cables 1,000 ft. long are kept ready, on special reels, to be used in making quick temporary repairs in case of damage by storms or blasting operations, etc. Mr. Johnson has in mind the construction and equipment of an emergency car equipped with a switchboard apparatus, emergency cable, selector equipment, etc., with which a temporary despatcher's office could be set up at any point.

Mr. Johnson discusses one of the principal objections to the use of the telephone, that an operator at a station does not know the location of approaching trains as he does when he has the Morse telegraph, by which he can hear what is going on among other offices while attending to his office work. With a head receiver so connected that he could move around the office, or with a loud speaking receiver, the operator could perhaps get this information from a telephone line; it is a question, however, whether operators ought to burden themselves with this information, a large portion of which is of no value to them. The constant wearing of a head receiver for eight hours is objectionable, as sometimes the pressure produces painful sensations; and it may make the ears too sensitive to weather conditions. On divisions of light traffic a signal circuit is provided so that way stations can call the despatcher by means of a buzzer, and he need not wear the receiver at all times. Some despatchers are nervous during thunder storms, but some of the oldest have found no trouble wearing the receiver through all kinds of storms. Rubber ear cushions are worn by some despatchers, but these are objectionable, as they cause excessive perspiration. The loud speaking receiver would seem to be the best remedy for troubles due to thunder storms. Many of the oldest despatchers have worn the head receivers through all kinds of storms and have never received any injury, but there is a snapping and crackling sensation which disturbs the more timid.

The benefits derived from the use of the telephone, as summarized by Mr. Johnson are set forth in about the same way as has been done by other superintendents in the past. Using the telephone a period of one or two months is sufficient to train an operator, as compared with six months to a year where the Morse telegraph is used. The saving in the time of sending and completing orders is estimated at about 40 per cent. With the telephone there is no chance that an operator will leave the train-wire open. Many operators have said that it seemed a hardship to go back to the telegraph key, as has had to be done in case of trouble on the telephone selectors. Many telegraphers suffering from paralysis of the fingers or other disabilities have been enabled to maintain their positions. Derailments have been prevented; Mr. Johnson, however, gives only a single instance, that where a trackman discovered a

broken flange and the train endangered by the break was stopped just before going down a steep grade.

The conclusion of the paper is that as the use of the telephone is constantly being extended, it is not rash to predict that it will eventually supersede the telegraph entirely, not only for despatching, but for the transmission of messages also.

REPORT ON GOTHENBURG COLLISION.

The Interstate Commerce Commission has issued a report, by Chief Inspector Belnap, dated April 16, giving the causes of the rear collision of passenger trains on the Union Pacific at Gothenburg, Neb., March 14, in which four passengers were killed. This collision occurred at 3:37 a. m. in a severe snow storm, and the cause was the failure of the engineman of train No. 12 to see an automatic signal which indicated stop about 1,000 ft. in the rear of passenger train No. 4, which was standing at the station. The distant signal, 2,427 ft. in the rear of the stop signal, was at caution and the engineman saw it and reduced his speed to about 20 miles an hour, but smoke and snow blowing to the southward obscured the home signal and he passed it without seeing it; then, while drifting along and trying to locate his position, he suddenly saw the fusee which was being waved by the flagman of the standing train about 100 ft. in the rear of the last car. Train 4 had been there only two minutes, and no blame is attached to the men on that train. The fireman, on account of some little difficulty in keeping up steam, had seen none of the signals during the run from North Platte, about 35 miles. The engineman had a good record of 14 years' standing. He had been on duty only two hours and seventeen minutes.

This report, in explaining the spacing of the trains over the 35 miles from North Platte to Gothenburg, incidentally shows the care and precision with which flagging is carried out on the Union Pacific, and also illustrates some of the difficulties of flagging. Passenger train flagmen have been instructed—whether in print or by word of mouth does not appear—that at regular stops the flagman must immediately take his position 60 ft. from the rear of his train and be prepared to protect his train should an emergency arise. After waiting five minutes, if the train does not start, he must go back, according to rule 99. Flagman Frosch was carrying out this rule at Gothenburg. His train was behind time, and so was the following train; but the line is fully equipped with automatic block signals, and as telegraph offices were 12 miles or more apart, dependence for spacing was placed wholly on the block signals.

About one mile east of North Platte there is a long bridge, over which the road is single track. On this bridge the signals, on the night in question, were out of order, and stood in the stop position throughout the night, all trainmen being notified accordingly. But although, according to the report, the trainmen had been notified, it is also said that the conductor of No. 12 instructed his engineman to carry the flagman on the engine and proceed slowly across the bridge, not deeming it safe for the flagman to walk across ahead of the train on account of the severe storm. Train No. 4 had also complied with the rule requiring a flagman to be sent in advance when a signal on single track indicates stop; and it consumed 17 minutes in crossing the bridge; but No. 12 took only about 10 minutes, thus shortening the time interval between the two trains, which had been 16 minutes apart leaving North Platte. The time interval was further shortened, because the second train made no stops at stations.

LONGITUDINAL RAILWAY, CHILE.—During 1912 there were 362 miles of railroad constructed at a cost of \$14,999,000 by the syndicate building the Longitudinal Railway connecting Santiago and Iquique under a 5 per cent. guaranty by the Chilean government. It is expected this line will be completed and open for traffic before the close of 1913.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.

Includes Among Other Important Reports Those on Self-Propelled Cars and Semi-Bituminous and Lignitic Coals.

The fifth annual convention of the International Railway Fuel Association was held in Chicago, May 21-24. President H. T. Bentley, principal assistant superintendent of motive power, Chicago & North Western, presided. The opening prayer was offered by Rev. William Carson Shaw.

The secretary reported a total of 523 members, which during the convention was increased to about 590. The total number of members attending the convention was 278.

PRESIDENT'S ADDRESS.

Mr. Bentley commented on the rapid growth of the association since its inception five years ago, the membership having grown from 35 to over 500 members during that time. He pointed out that whereas 500,000,000 tons of coal are used annually, only 75,000,000 tons are actually turned into service and power, showing what a wide field of improvement was possible by fuel engineers. A great saving may be made by those having anything to do with fuel by carefully studying the various conditions under which they are handling it. Its constantly increasing cost requires that a special effort be made for the satisfactory use of the lower grades of coal. There are quantities of lignite beds throughout this country which, if a uniform supply was required, could be mined at a profit; therefore by stimulating its use a much cheaper fuel would be available. This fuel has been used successfully on locomotives and is also suitable for the production of producer gas.

Another feature in regard to cheaper fuel is the use of pulverized coal which is being investigated by one of the railroads. The obstacles heretofore encountered appear to have been in the inability of the fire brick to withstand the intense heat generated, and means for properly pulverizing and storing the coal in the tender. Attention was also directed to the fact that the coal could perhaps be obtained from the mines at a reduced cost during the summer months and stored with a net saving. Mention was made of fuel saved, due to the better design of locomotives and the use of superheaters.

MR. QUAYLE'S ADDRESS.

Robert Quayle, superintendent of motive power, Chicago & North Western, mentioned the possibilities of increasing the thermal efficiency of locomotives. He agreed that the large grate area was more efficient for burning coal as suggested in Dr. Goss' paper of last year. Particular stress was laid on the proper preparation of the coal for the locomotive and of assisting the fireman as much as possible in the performance of his work. An important factor is the co-operation and team work between the engineer and fireman. The use of brick arches and superheaters was advocated, the latter to be applied to all classes of engines, even switchers.

MR. PEABODY'S ADDRESS.

Francis S. Peabody, president of the Peabody Coal Company, Chicago, followed Mr. Quayle with an interesting talk from the operator's standpoint. He stated that about 40 per cent. of the coal was left in the mines for the simple reason that it could not economically be removed. There are 22,000,000 acres of coal in the State of Illinois and only 1 per cent. of it is being used. About 57,000,000 tons are being taken from these mines and records show that the average production doubles in about 10 years. In speaking of the railroad contracts he said that the maximum and minimum clause was causing great inconvenience to the mine operators, as the roads were inclined to demand the maximum tonnage at times that were most inconvenient for the operators to supply it. This was especially true in case of strikes. The strike of 1912 caused an increase of 6 cents per ton in the cost of coal.

In 1897 the cost of coal at the mine was 25 cents per ton, but now it is 90 cents. Sixty per cent. of this is paid to labor. Railroads should store four months' supply during the storage period as advantage could be taken of the decrease in traffic and the lower cost for transportation, and it would keep the mines busy during the dull season. A storage yard with trestles and steam shovels for loading was recommended, the cost of storage being only 15 cents per ton—2 cents for unloading, 3 cents for loading and 10 cents for depreciation. These figures, however, apply only to certain grades of coal; others depreciate more rapidly.

CONTRACT FORM FOR PURCHASE OF COAL.

A proposed standard form of contract covering the purchase of railway fuel coal was presented by a committee of which J. G. Crawford (C. B. & Q.) was chairman. One of the provisions on which there was a difference of opinion was the relation of car tonnage to the number of the purchaser's cars at the mine. Eugene McAuliffe (Frisco Lines) questioned the desirability of mentioning in the contract the number of cars to be supplied at the mine by the purchaser, while thoroughly believing that the purchaser should co-operate with the mine operator in this respect. He favored the storage of coal where practicable and strongly recommended that the invoices should carry the serial number of the contract. In considering the contracting of coal as a general proposition, Mr. McAuliffe pointed out that the condition of the mine should be considered by the railroad on whose line the mine was located, or on which the railroad relied for its coal supply. By this is meant the accepting of fuel that is not quite up to standard, but must be disposed of, the price, of course, being satisfactory to both the operator and the railroad.

Other members suggested that the contract should include specifications as to the fusing point of the ash, the heat value, the percentage of ash in the coal, and a standard method of obtaining samples.

SUB-BITUMINOUS AND LIGNITIC COALS.

Samuel B. Flagg, engineer, Department of the Interior, Bureau of Mines, read a paper on this subject from which the following is taken:

The effort to reduce operating costs has resulted, on the one hand, in a demand for much more powerful locomotives, and, on the other hand, in a tendency to utilize lower grades of fuel, among which may be mentioned the lignitic and sub-bituminous coals found in certain sections of the country. Lignitic coals are characterized by a high moisture and high volatile matter content, by a fairly low percentage of ash, and by a low heat value. The lower grades of sub-bituminous coal differ from the lignites mainly in their appearance, as is indicated by the designation "black lignites" that is frequently given them. These lower grades of sub-bituminous coal like the lignitic coals, are high in moisture and volatile matter contents and low in heating value. Their behavior upon exposure to the air is also similar to that of the brown lignites. The better grades of sub-bituminous coals, on the other hand, have a much lower moisture content and higher heat value; in fact, the heat values of some of them are considerably higher than those of many of the bituminous coals. Even these high grade sub-bituminous fuels, however, have the same tendency to disintegrate upon exposure to the air, and the same is true upon exposure to heat in a furnace. Another characteristic feature of both the lignitic and sub-bituminous coals is their liability to heat in the pile or bunker and to take fire spontaneously.

A few typical analyses of fuels from some of the different fields are given in the table below, the last two being classed

by the U. S. Geological Survey as medium grade bituminous coals, although they are frequently designated as sub-bituminous or lignitic coals. The Bureau of Mines is authority for the analyses given in the first, sixth and seventh columns.

Proximate Analysis.	Gebu, Bighorn Co., Wyo. (Sub-Bit.)	Hudson, Fremont Co., Wyo. (Sub-Bit.)	Roundup, Musselshell Co., Mont. (Sub-Bit.)	Erie, Weld Co., Colo. (Sub-Bit.) U.P.	Gallup, McKinley Co., N. Mex. (Sub-Bit.)	Williston, Williams Co., N. Dak. (Lignite).	Rock Springs, Sweetwater Co., Wyo. (Bit.) U.P.	Superior, Sweetwater Co., Wyo. (Bit.) U.P.
Moisture ...	16.58	6.72	8.37	7.83	15.84	11.90	42.88	7.32
Vol. Mat...	31.97	45.06	41.10	32.66	34.55	37.85	24.22	39.83
Fix. Car....	46.05	39.51	48.02	53.63	43.95	41.57	24.96	45.37
Ash	5.40	8.05	3.51	5.88	5.34	8.68	7.94	6.42
Sulphur ...	.64	.66	.38	.22	.32	.56	1.53	1.06
B. t. u.....	10,609	11,462	.....	12,771	10,215	11,077	5,683	12,017
								12,283

It has been estimated* that of the coal easily accessible and still remaining in the coal fields of the United States one-third is represented by the lignitic and sub-bituminous deposits. The principal beds of these coals are found in Texas, North Dakota, South Dakota, Montana, Wyoming, Colorado, New Mexico and Washington. The fields of the lower grade coals commercially most important today are those in Montana, Wyoming, Colorado, New Mexico and Washington. About 2,000,000 tons of sub-bituminous coal per year is taken from the Bull Mountain field in Musselshell county south of Roundup, and the Red Lodge field in Carbon county near Red Lodge in Montana.

Mining costs in the different fields producing sub-bituminous coals vary considerably, probably ranging between 80 cents and \$1.70 per short ton as extreme values. These costs, of course, are proportionately higher where the output is small than where the development has been more extensive. They are also affected by the physical mining conditions.

Because of the disintegrating effect of heat on these coals, it is especially important that the coal in the tender should contain little slack. Nearly all of the sub-bituminous coals suffer more or less seriously from breakage unless carefully handled in the screening and loading processes. In the loading of either open or closed cars precautions may be taken by using an apron on the screens or the car-loader so that the coal has less of a fall.

Opinions seem to differ as to the necessity for shipping these fuels in closed cars when intended for railroad use. The cost of loading and unloading box cars is obviously greater than when gondola or drop-bottom cars are used. The increased cost obtained from three authorities ranges from four to ten cents per ton of coal. This is probably offset to some extent by the prevention of loss in transit.

The question of storing such coals involves not only the slackening and the deterioration resulting therefrom, but also the liability of spontaneous combustion. The author's limited experience with coals of this type leads him to the belief that they may possibly be stored for a short time without serious deterioration from the standpoint of their steaming value in locomotive use, but that the coals which are not impaired after storage for a year are more likely medium grade bituminous coals than either sub-bituminous or lignitic.

*Production of Coal in 1907, by E. W. Parker, in Mineral Resources for 1907, U. S. Geological Survey.

The liability of spontaneous combustion, although greater for the lignitic fuels, is considerable in the case of the sub-bituminous coals and dust or slack must not be allowed to accumulate.

The substitution of these low grade coals for bituminous fuel introduces, in addition to the difficulties already mentioned, a number of problems of operation. The grate area must be greater—one authority says 50 per cent. greater—than would be required for good bituminous coal. High drafts are necessary to maintain the required rates of combustion, and to get them the exhaust pressures must be increased to such an extent that the efficiency of the locomotive is reduced 5 to 10 per cent. thereby. One point in favor of these coals that should not be overlooked is the freedom from clinker troubles. The percentage of earthy matter in them is usually low—in many instances under 5 per cent.—and the sulphur content is also low.

In some sections the greatest problem connected with the use of sub-bituminous fuels has been the one of preventing spark troubles. The first attempts to solve this problem were made with different sizes and arrangements of screens and usually included two screens for the gases to pass through. It was usually found, however, that one of the screens clogged and prevented the free steaming of the engine. By using a single screen properly set most of the clogging trouble can be done away with, unless there is a steam leak in the smoke box or wet slack coal is being used, and some roads claim to have found the screen as satisfactory and effective as any means for eliminating spark troubles. Screens set horizontally will, with some forms of stacks, remain clear longer and give less trouble than if set on an incline, and likewise small mesh netting of small wire is more satisfactory than small mesh netting made of large wire.

A front-end arrangement designed to reduce in size the sparks or cinders, and also delay their delivery from the stack has been patented by the American Locomotive Company. On the western lines of one road a number of locomotives have been equipped with this device and it is stated that the sparks are reduced to such small size that they give no trouble. Some of the engines so equipped have been in service as long as four years, and others for over two years, and during this time no fires have been set by sparks from them, although they are operated on the most dangerous divisions of the line.

Another front-end arrangement was designed by one of the road engineers of a western road and has been used principally in locomotives burning coal from the Roundup, Montana, district. With this arrangement the sparks do not pass through any screens or netting, the success of the device depending rather upon the delayed delivery of the solid particles, thus allowing them time to cool down.

In the following table are given some of the principal data and results of road tests made by different railroads to determine the value of the lower grade fuels. The variation in the equivalent evaporation per pound of coal as fired shows probably better than anything else the relative values of the coals for locomotive service. For the last three tests these figures could not be inserted, as it was impossible to compute them from the data at hand. So far as the writer knows none of these coals in question have the very high moisture content or the other identifying lignite characteristics such as those of the

Gross ton-miles	Number of cars in train	Train weight, tons	Average steam pressure	Coal used, pounds	Water used, gallons	Average per lb. of coal fired	Equiv. evap. from and at 212° F.	Average speed miles per hour	Service	Remarks
86,594	11.67	632.0	195.9	24,916	14,724	5.95	29.65	Passenger	Hannah, Wyo., Sub-Bit.,	C. & N. W.
88,291	11.33	633.3	192.0	33,120	14,304	4.34	28.30	Passenger	Erie, Colo., Sub-Bit.,	C. & N. W.
213,149	51.66	1,888.9	177.1	42,360	27,255	6.47	17.15	Freight	Hannah, Wyo., Sub-Bit.,	C. & N. W.
209,541	55.33	1,853.0	176.2	57,311	28,435	4.99	14.30	Freight	Erie, Colo., Sub-Bit.,	C. & N. W.
.....	7.2	.....	201.0	17,960	10,265	5.86	32.90	.....	LaFayette, Colo., Sub-Bit.,	C. B. & Q.
.....	7.5	.....	203.0	11,650	10,030	8.76	33.20	.....	Las Animas, Colo., Bit.,	C. B. & Q.
161,117	34.0	1,445.0	194.0	17,749	11,900	6.83	.....	.....	Roundup, Mont., Sub-Bit.,	C. M. & St. P.
145,011	.....	.....	.....	34,034	19,575	.....	23.1	Freight	Hudson, Wyo., Sub-Bit.,	C. & N. W.
113,387	21.5	588.9	.....	38,726	21,841	.....	21.9	Freight	Hudson, Wyo., Sub-Bit.,	C. & N. W.
136,387	.....	.....	.....	20,845	13,428	.....	23.8	Freight	Buxton, Iowa, Bit.,	C. & N. W.

Williston, N. Dak., fuel, analysis of which is given in the first table in this paper.

The costs of using bituminous and sub-bituminous coals given below were determined for one road whose sources of supply for the two kinds of fuel were Buxton, Iowa, and Hudson, Wyo., respectively. Cody, Neb., was considered as the approximate dividing point for the use of the two fuels and costs were figured to and from that point, using the results of a dynamometer car test as the basis of computations.

BITUMINOUS COAL.	SUB-BITUMINOUS COAL.
Price at Buxton, Ia.....\$133.83	Price at Hudson, Wyo.....\$153.26
Cost of haul to Cody, Neb.. 196.26	Cost of haul to Cody, Neb.. 171.46
Cost to return empties..... 54.63	Cost to return empties..... 47.88
Total cost .....\$384.72	Total cost .....\$372.60
Saving in favor of Wyoming coal, \$12.12.	

The results of these tests show that the better of these low-grade fuels can be used, and, in fact, they are today being used over those divisions of the roads where length of haul of bituminous coal makes it too expensive or otherwise inadvisable to use the latter fuel. Some of the lines which are today using this sub-bituminous fuel are using it on the same engines that at other times burn bituminous coal. It is possible that it may sometimes be found of sufficient advantage to build all the locomotives which are to be fired with the lower grade fuels with special reference to obtaining the best results from them.

The probability of a marked increase in the use of the true lignites in the near future is believed to be not great. The present undeveloped condition of the parts of the country in which the lignites are found, their low heating value, and the availability of the better sub-bituminous coals are all factors that will check the increased use of lignitic coals for steaming, and particularly for locomotive purposes.

DISCUSSION.

C. T. Malcolmson stated that the heat value of run-of-mine coal was increased 18.4 per cent. by briquetting as shown by some 600 tests.

W. S. Roberts (Roberts & Schaefer Company) mentioned as the greatest factor in briquetting the obtaining of a suitable binder. His experience showed that a pitch binder had given the best results. The whole proposition of briquetting is a purely engineering one, and it should be carefully studied. Most of the failures are due to not giving it the proper consideration.

J. G. Crawford (C. B. & Q.) stated that there should be plenty of air opening in the grates, that the ash pan should be tight and the air openings should be covered with netting. He also found the lignite burning locomotives not as powerful as those burning bituminous coal.

E. W. Pratt (C. & N. W.) mentioned engines in service on his road that were especially designed for burning lignite. These have a grate area 50 per cent. larger than the other engines of similar type, but until the gyrus spark arrester was installed they threw a large number of sparks.

Mr. Crawford thought that brick arches should be used on all lignite burning engines on account of the large amount of slack in the fuel and the rapid breaking of the lumps.

Mr. Flagg stated that this device would greatly increase the efficiency of the fuel as it would allow the high volatile matter to become thoroughly consumed.

SELF-PROPELLED CARS.

The authors of this paper, S. T. Dodd and B. H. Arnold, of the engineering department of the General Electric Company, considered all types of self-propelled cars, but went more thoroughly into the discussion of those with internal combustion engines. In a summary of those operated by steam the committee said:

"In summing up the position of the steam motor car, we note that of all the types which have been built very few have been duplicated and none have been adopted as standard by operating roads in spite of the fact that they have been before the

public for a length of time reasonably sufficient for their development. The objections which seem to have prevented their success are apparently:

"Cost of maintenance. The necessity of developing a relatively high horse power in a limited space results in a special or cramped design of boiler and engine which is not economical in maintenance or repair.

"Limited tractive power, or excessive weight on drivers. The majority of cars of this type which have been built have the driving power applied to one axle only. Frequent stop service, for which the independent car should be particularly fitted, demands a high tractive effort in starting, if acceptable schedule speeds are maintained, and such tractive effort is not obtainable without a fairly high proportion of the weight upon driving axles. This results in excessive weight on the driving wheels when there is only one driving axle.

"Limited operating radius: Tanks of 100 gals. of fuel and 1,000 gals. of water seem to be acceptable in practice. This represents a weight of fuel and water of nearly 10,000 lbs., and gives apparently an operating radius of only about 50 miles for fuel and 30 to 40 miles for water. For practical success, it appears that such a car should have an operating radius of about 100 miles without recharge."

The chief difficulty in regard to cars operated by compressed air seems to lie in their inability to develop a sufficiently high speed for railway service with a thoroughly practical design.

In the consideration of the storage battery car it was shown that while cars of small capacity and of a rather limited radius of operation had proved very successful in street car service "a car for branch line service might fairly be assumed to have a weight of 40 tons and to require about 50 watts per ton mile for operation. This is equivalent to 2 k. w. per car mile, or for a run of 100 miles, without recharging, would require a battery which would have a weight of about 10 tons or one-fourth the total weight of the car. These figures are presented to show that long distance operation of heavy cars without recharge of battery would entail a prohibitive weight of battery."

Internal Combustion Engine Car.—Under this heading were considered the gasoline cars with mechanical and electrical transmissions. The McKeen car was somewhat briefly described, its maximum low and high speeds being given at 10 to 15 m. p. h., and 60 to 70 m. p. h. respectively. In April, 1913, 138 of these cars were in service on 50 different railroads. Among other mechanical drive passenger cars the Fairbanks-Morse Company, Chicago, has built a car with single trucks, steel body and a seating capacity of 21. The P. H. Batten Company, Chicago, has also built cars of this type with a seating capacity of about 30 passengers which are in operation on three roads in the central west. The Stover Motor Car Company, of Freeport, Ill., has supplied small single truck gasoline cars on the Waterloo, Cedar Falls & Northern and the Chicago, Rock Island & Pacific. The Hall-Scott Motor Company, Oakland, Cal., has built double truck cars with a seating capacity of 50, and a 100 h. p. four cylinder engine driving the rear axle through longitudinal transmission and double gears.

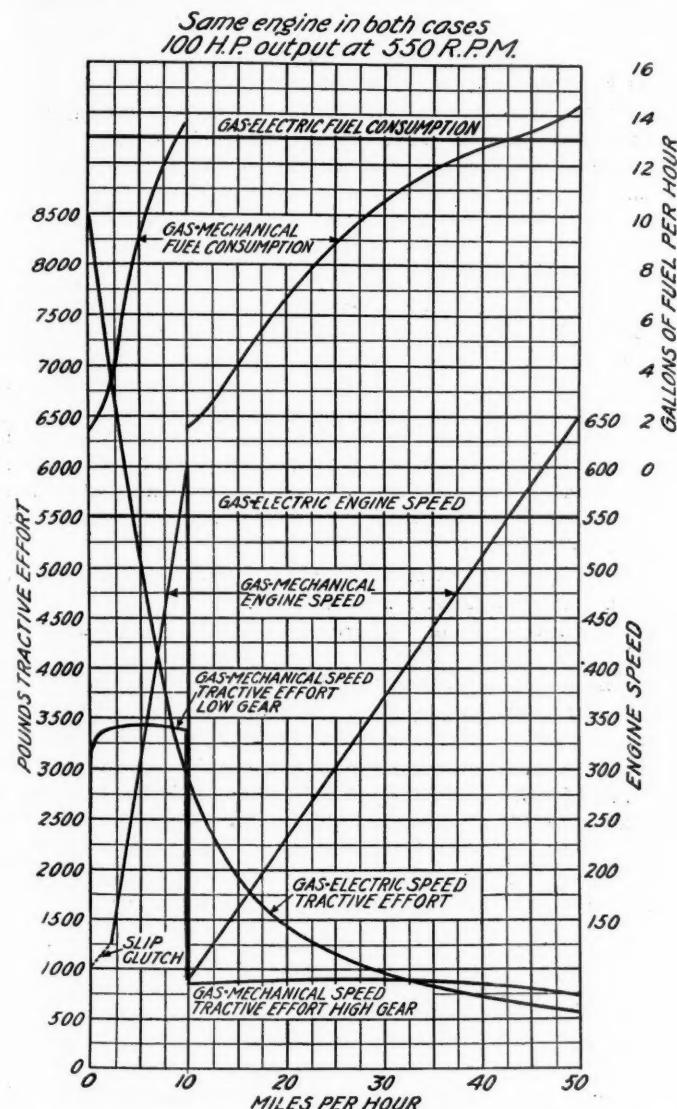
The gas-electric car was next considered, the General Electric Company's type being described. There are 50 of these cars in regular daily service. The operation of the gas-electric car, made by the French Westinghouse Company, and which has recently been introduced in this country by the Drake Railway Automotrice Company, on the Arad-Csanad Railway, Hungary, was mentioned. These cars are running approximately 1,000,000 car miles per annum at an average maintenance cost of 2.5 to 3 cents per mile.

Speaking of the combination of the gasoline electric car with a storage battery auxiliary, the paper said:

"The fact is, that the storage battery is of no real value in combination with the electric drive, as it has been developed today. The real value of the electric drive is the possibility of working through a wide range of voltage and current. With a storage battery auxiliary this advantage would be eliminated, as

the generator would be forced to work at the constant voltage of the storage battery. The weight and cost of the battery is a considerable item and the same weight and cost could be expended to greater advantage in increasing the capacity of the engine and generator, if necessary.

Comparing now the characteristics of the mechanical drive gasoline car, and the electric drive gasoline car, the fundamental difference between them lies in the method of transmission of the power between engine and axle. The comparison of the characteristics is well illustrated in the curves shown herewith. These curves show the speed, tractive effort, and gasoline consumption of a car equipped with a 100 h. p. 550 r. p. m. gasoline engine, driving in the one case, through electrical transmission,



Characteristics of Gasoline Car. Mechanical Transmission Compared with Electrical Transmission.

the motors geared to 33 in. driving wheels, and in the other case, through mechanical transmission, a single pair of driving wheels, 42 in. in diameter. The slow speed gear reduction has been assumed at 7.5 to 1 and the high speed gearing at 1.6 to 1. These conditions correspond approximately to those ordinarily obtained on mechanical drive gasoline cars of this weight and capacity. The following characteristics are to be noted:

"In the electric drive car the engine speed is independent of the car speed and is maintained at the normal value 550 r. p. m. throughout the whole range of car speed. In the mechanical drive the engine speed is proportional to the car speed. It starts at a low value with the starting of the car, and increases with the car speed up to 600 revolutions at a car speed of 10 m. p. h.

At this point the change gear clutch is thrown in, the engine speed is cut down to 100 r. p. m., with the higher gearing, and is again raised with the car speed to 650 r. p. m., at a car speed of 50 m. p. h.

"The engine horse power is approximately proportional to the engine speed. With the electric drive the horse power is maintained at 100 h. p. throughout the range of car speed, but with the mechanical drive the horse power varies, reaching its maximum value at the maximum speed corresponding to the two gear ratios.

"The electric drive car, on account of its constant horse power output, develops a tractive effort which varies inversely with the speed. The speed-torque characteristic of the electric drive is very similar to that of the steam locomotive. The maximum tractive effort is limited by the slipping point of the wheels, or by the maximum current which the generator can drive through the motors with the full engine output. General Electric gas-electric cars will in practice develop a maximum tractive effort of 10,000 to 14,000 lbs., depending on the gearing."

Fuel—The authors stated that the Baumé or any other such scale told very little of the relative suitability of various gasolines or naphthas as they would be greatly affected by the character of the oil field from which they originally came. A better method is based on the fractional distillation. The following is abstracted from the remainder of the report.

"The specifications of these light distillates should give the initial boiling point, that is the point at which the liquid starts to vaporize, the final boiling point at which all liquid has disappeared from the flask, and possibly two or three points in between and the percentages which should boil over at these temperatures. The initial boiling point should be the maximum temperature which will insure easy starting. Final boiling point should be set as high as possible so as to produce a fuel which will not burn too rapidly, and yet this must not be so high as to cause carbon deposit. Fuel should, of course, be free from water and other impurities.

"The following specification for liquid fuels will be found very satisfactory for use on gas electric cars. As a matter of fact, a considerable number of cars are operating with fuels having dry points in excess of those here specified:

"Fuel shall be free from impurities.

"The initial boiling point shall not be in excess of 185 degs. F.

"Dry point shall not be in excess of 356 degs. F. (Dry point will be indicated by a small puff of white vapor from residue in flask.)

"The fractional distillation proceeding at the rate of one drop per second should be recorded in 10 per cent. cuts.

"The first 10 per cent. should distill at a temperature not in excess of 230 degs. F.

"Fifty per cent. should distill at a temperature not exceeding 270 degs. F.

"Not less than 97½ per cent. of the liquid should be recovered from the distillation.

"Generally speaking, alcohol, either wood, grain or denatured, is a fuel better even than gasoline, and undoubtedly will figure more prominently in the future than it has in the past. Its advantages lie in the fact that it can be obtained from any vegetable matter and is, therefore, available in nearly all parts of the earth. The apparatus required is simple, inexpensive and the cost of production small. Chemically, alcohol is a much more simple substance than gasoline and will be found more uniform. The one bar to its use is a legal one. The government requirements as to inspection, bonding and storing are such as to increase the price unduly. Once these restrictions are removed, alcohol should be a popular fuel. It is true that alcohol has a lesser heat value than gasoline, 14,000 B. t. u., as compared with gasoline at about 20,000, and, therefore, somewhat larger quantities will be needed for the same amount of work, but alcohol should be profitably sold for 4 or 5 cents a gallon if the legal restrictions were out of the way."

The following operating results of the General Electric Com-

pany's gas-electric cars on the Minneapolis, St. Paul, Rochester & Dubuque Electric Tract. Company were included:

COST OF OPERATING GAS-ELECTRIC MOTOR CARS FROM JANUARY 1 TO AUGUST 31, 1912.		
Total motor car miles.....	216,498	
Total trailer car miles.....	75,948	
Total car miles.....	292,446	
Per cent. of time trailers hauled.....	35.5	
Number of motor cars in service.....	8	
Length of line, miles.....	37.34	
Maximum grade, per cent.....	1.5	
Schedule time for express trains.....	1 hr. 17 min.	
Average distance between stops for express trains, miles.....	3.734	
Schedule speed m. p. h. of express trains.....	29.1	
Schedule time for local trains.....	1 hr. 35 min.	
Average distance between flag stops for local trains, miles.....	1.067	
Schedule speed m. p. h. of local trains.....	23.6	
Gals. fuel used per motor train mile.....	.758	
Gals. fuel used per car mile.....	.527	
Total cost for 1 year.....	Avg. cost per motor train mile.....	Avg. cost per car mile.....
Wages of crew.....	\$0.0557	\$0.0412
Fuel (naphtha).....	.0814	.0603
Lubrication (gas engine).....	.0052	.0039
Journal oil.....	.0004	.0003
Supplies and car heating.....	.0064	.0047
Maintenance of electric equipment.....	.0090	.0067
Maintenance of cars and trucks.....	.0065	.0047
Shop expenses of heating.....	.0162	.0120
	\$39,139.71	\$1,808
		\$1,138

An appendix included a list of questions to be used in the qualifying examination for gas-electric motor car operators, a monthly report of mileage and expenses and a report of expense of general overhauling.

DISCUSSION.

O. S. Beyer (C. R. I. & P.) spoke of the storage battery car as being too light to meet the conditions of railway service with the increasing demand for steel equipment. The maintenance costs, the reliability and depreciation of the gas-electric car should also be considered, the latter item being considerable when compared to the depreciation of a small locomotive and car which it replaces.

D. C. Buell (U. P.) pointed out that the chief troubles experienced with all motor cars were from a lack of the proper instruction of the men handling them, that the whole proposition was in its infancy, comparatively speaking, and that troubles should be naturally expected. The motor cars are here to stay and their development will constantly be going on.

J. H. Tracy (Electric Storage Battery Co.) presented a written discussion stating that the lead battery car could be operated at 100 miles per charge at a free running speed of 30 m. p. h. with a seating capacity for 70 passengers and a suitable baggage compartment. A car 34 ft. 4 in. long, weighing 32,000 lbs., the battery weighing less than 8,000 lbs., and having a seating capacity for 32 passengers, is being operated on the Lewisburg, Milton & Watsontown Passenger Railway. This car has run 20,000 miles, or approximately 122 miles a day, from October 9, 1912, to April 1, 1913, losing only 19 miles from the full schedule which was due to a damaged charging plug. The current consumption was 4.25 ampere hours per car mile. With an average live load of 1½ tons the actual power consumption amounts to 41 watt hours per ton mile. The ruling grade is 0.7 per cent. A two-car train can also be successfully operated at a decrease in the power consumption of two single cars.

F. E. Drake (Drake Railway Automotrice Co.) mentioned the service given by the "Dracar" gas-electric motor car, on the M. O. & G. Five cars are in service, the longest run being 210 miles per day. During the month of April 15,800 car miles were made at 3.3 miles per gallon of gasoline. The operating expenses per car mile were 16.4 cents. Three men are required on each car because of the state laws.

J. E. Osborn (Ann Arbor) reported that one of the main troubles with the McKeen motor car was the breakage of chains. He also stated that they operated on 2½ miles per gallon. Kerosene has also been used as a fuel with these cars.

It was also brought out that motor cars were oftentimes operated under conditions that were unsuitable for steam trains, and that trouble should be expected in these cases.

MODERN COALING STATION.

A progress report of the committee on modern locomotive coaling stations, of which Hiram J. Slifer, consulting engineer, is chairman, was presented. The committee, realizing that no definite design of coaling station could be made to fit the conditions of all climates, has only considered certain dominant factors that pertain in all cases. The committee recommended that a careful study regarding the character and permanency of the fuel supply be made before constructing permanent chutes; that the coaling stations be located away from the terminal a distance equal to that which can be covered by one tank supply of coal, and that no engines, except possibly one or two fast passenger engines, be coaled at the larger terminals. This recommendation, of course, being subject to the prevailing conditions. Forty-one questions were sent to the members for reply, but sufficient information has not been collected to make possible a complete report. Eighteen replies were received.

The gravity chute was generally favored where sufficient room was available and the cost of property was not excessive. Eight members favored this type where 10,000 tons or more are handled per month. Twelve members favored the balanced bucket type where space for chutes was restricted. This type was especially favored for large stations. The bucket type conveyor was recommended by three members and it was especially noted that where this or the previous type was used there should be a duplicate hoisting arrangement. Seven members recommended the locomotive crane and clam-shell for the smaller stations and for temporary use. Three members recommended the use of the inclined trestle with coal pockets, into which the coal is shoveled from the cars, for smaller stations handling less than 50 tons per day and where a more expensive plant could not be considered. An inclined skip car type of plant and a mono-rail system taking the coal from depressed tracks to the bins were also suggested.

Frame, concrete and steel construction were all recommended for various circumstances such as permanency of structure and economical considerations. Creosoted timbers were also mentioned in connection with the frame construction. It was the unanimous opinion that an operator should not be required to look after more than one plant. As a general rule the storage of coal was not recommended except under special conditions.

Eight replies opposed a weighing device for determining the amount of coal consumed by each locomotive, six favored it and three were qualified but in favor of it. The consensus of opinion was in favor of gasoline engines for operating mechanical coaling stations. It was agreed that there was more or less depreciation due to coal passing through a handling plant, but this could be corrected to a certain extent by breaking the fall of the coal through deflectors, spirals or by some other mechanical device. Considerable difficulty has been experienced in handling plants by the lump being separated from the fine coal with a result that some engines get all fine coal and others all lump.

The locomotive crane equipped with a clam shell bucket was not considered as good as the modern coaling station and should be used for emergency service only. The following reply gives the operating costs of different types of stations:

Two Balanced Buckets, 350 Tons Capacity.—First cost, \$22,000. Cost of operation, 2 to 8 cents per ton; average cost, 3½ cents per ton. Cost of maintenance, 2 cents per ton. Fixed charges, interest 5 per cent. and depreciation 5 per cent. per annum, 2 cents per ton.

Link Belt, Bucket Conveyor, 700 Tons Capacity.—First cost, \$37,000. Cost of operation, 1.7 cents per ton. Cost of maintenance, 1.4 cents per ton. Fixed charges, interest 5 per cent. and depreciation per annum 5 per cent., 1.5 cents per ton.

Inclined Conveyor, Belt, 150 and 350 Tons Capacity.—First cost, \$9,000. Cost of operation, 5.6 cents per ton. Cost of maintenance, 3.0 cents per ton. Fixed charges, interest 5 per cent. and depreciation 5 per cent. per annum, from 1.0 cent to 2.0 cents per ton.

Inclined Conveyor, Belt, 150 and 350 Tons Capacity.—First cost, \$10,400 and from \$13,000 to \$23,000. Cost of operation, from 1.5 cents to 8.8 cents per ton. Cost of maintenance, from 0.1 cent to 0.7 cent per ton. Fixed charges, interest 5 per cent. and depreciation 5 per cent. per annum, from 1.4 cents to 3.6 cents per ton.

Locomotive Crane.—Average total cost, 20 cents per ton.

Inclined Trestles with Pockets.—First cost, \$4,000 to \$12,000. Cost of operation, from 1.0 cent to 5.0 cents per ton. Cost of maintenance, average 2.0 cents per ton. Fixed charges, interest 5 per cent. and depreciation 10 per cent. per annum, from 1.0 cent to 2.0 cents per ton.

Large Balanced Buckets, 15 Tons Capacity, Running Up Vertically and over Horizontal Track, Capacity 1,500 Tons.—First cost, \$64,000. Cost of operation, 2.0 cents per ton. Cost of maintenance, 3.0 cents per ton. Fixed charges, interest 5 per cent. and depreciation 10 per cent. per annum, 1.6 cents per ton.

DISCUSSION.

J. W. Hardy (C. R. I. & P.) presented some photographs showing the manner in which the coal is broken up after passing through a coaling station, and said that run-of-mine coal with 50 per cent. slack would run as high as 72 per cent. slack after passing through the coaling station. Another test with railroad lump having 25 per cent. slack when received in the car showed an increase of 40 per cent. slack by the time it got on to the tender. He substantiated the replies received by the committee in regard to this question.

J. G. Crawford (C. B. & Q.) stated that egg coal in passing through such stations would come out worse than run-of-mine coal, which could be purchased for from 15 to 20 cents a ton less.

LOCOMOTIVE BOILER SCALE.

J. S. Sheafe (Ill. Cent.), chairman, read the committee report on this subject. The committee was unable to secure much data on the subject of heat loss due to boiler scale, and believes that such loss is considerably over-estimated. It was pointed out that in order to keep the tubes 100 per cent. clean the tube borers should be educated as to the importance of doing their work in a thorough manner and that they should be carefully watched by the foreman in charge. Convenient and accessible plugs should be supplied in order to thoroughly inspect the boiler after it has been washed out.

Larger arch tubes were recommended to adequately take care of the steam generated in them. The ideal way to treat water is in settling tanks so that it may be commercially pure before being put in the boiler. The adding of a boiler compound by the guess method is to be generally discouraged, and each treatment should be chemically correct, as much harm may be done otherwise.

The use of pure amorphous graphite was strongly recommended as it is purely mechanical in its action, having a tendency to break off the scale as well as preventing its formation. A simple laboratory experiment was made by applying this grade of graphite to one side of a plate and intermittently boiling. After 80 hours, extending over a period of 10 days, the graphite was still as active in its protection of the plate as it was originally. The opposite side of the plate was rusty.

In an appendix to the report attention was directed to the return of Henry Kreisinger to the service of the United States Bureau of Mines to resume experimentation on the transmission of heat into steam boilers. It is planned at present to investigate the following factors: Effect of velocity of gas through tubes, effect of initial temperature of gas, effect of the steam pressure in the boiler, effect of the different diameters of tubes, effect of the different lengths of tubes, effect of conductivity of the tube metal (both iron and copper tubes will be used at different times), effect of scale on the water side of the tubes, and effect of a coating of soot on the gas side of the tubes. Illustrations accompanied the report showing the arrangement of the testing apparatus.

DISCUSSION.

Mr. Bentley emphasized the importance of keeping the boiler clean, both inside and out, and of the careful inspection by either candles or pocket flashlights, as used on the North Western. Too much boiler compound will be apt to pit the tubes.

W. E. Dunham (C. & N. W.) did not notice any appreciable difference between the hard and soft scale as regards the fuel consumption. He suggested that the arch tubes be increased in size in the engines handling specially bad water, but if used,

special care must be exercised to prevent failure. On the North Western the boilers are blown-off every mile in the bad water district to reduce the concentration of the boiler compound.

R. Collet (Frisco Lines) stated that too extensive blowing-off would greatly decrease the fuel economy.

OTHER PAPERS.

Construction, Development and Operation of a Bituminous Coal Mine.—J. A. Garcia, Allen & Garcia Company, Chicago, presented an interesting paper on this subject describing the latest practices in mine operation. He stated that an extraction of 75 per cent. should be made from a mine properly developed and operated 200 to 250 days per year. In the section of the country about Chicago the percentage of extraction is about 56 per cent. The remaining 44 per cent. is allowed to remain, as it would cost more to mine it than its price in the market. The best of engineering practice is required in the construction of a mine to insure its permanency and safety. It was stated that track scales under the tipple were unsatisfactory and should be so located only when it is not possible to secure the proper gradient.

W. S. Roberts, in the discussion, stated that this was an important item, as it would greatly facilitate the obtaining of correct weights and the railroads could aid the operators by locating their tracks accordingly. He also pointed out that a mine provided with up-to-date equipment would be in a position to furnish coal more nearly to specification than other mines without such equipment, and that this should be considered when comparing the various contract bids.

It was pointed out that the railways could greatly assist in mine operation by making their orders more uniform and keeping the mines supplied with cars, which in both cases would benefit the railroad as well as the mine operators. The variation in the quality of coal was laid to the labor conditions prevailing throughout the mining industry. It was also suggested that representatives of the miners be included in conservation committees as they were in a better position than any one else to effect the savings.

Firing Practice.—A committee, of which D. C. Buell (U. P.) was chairman, presented a report on what it considered the best practice in firing locomotives. It was well received and thoroughly discussed by the association. The different items included firing tools, draft appliances and blower, care of boiler tubes, hand firing, mechanical stoking, education of firemen, interesting railroad officers in fuel economy, waste of coal for which the fireman is responsible and methods of obtaining the co-operation of the fireman.

The committee is to incorporate in its next report the suggestions adopted during the discussion, together with designs of the best practice in firing tools.

OTHER BUSINESS.

The following officers were elected for the ensuing year: President, R. Collet, superintendent of fuel service, Frisco Lines; first vice-president, D. R. Sebastian, fuel agent, Chicago, Rock Island & Pacific; second vice-president, D. C. Buell, chief educational bureau, Union Pacific, Illinois Central and Central of Georgia. Executive committee, two years, B. P. Phillippe, C. F. Ludington, J. S. Sheafe and F. F. Gaines; for one year, Eugene McAuliffe and W. H. Averill.

Chicago received the largest number of votes for the next convention.

RAILWAY IMPROVEMENTS IN ROUMANIA.—A bill has been introduced in the Roumanian parliament to authorize the expenditure within the next five years of \$80,000,000, for the completion of railway lines now under construction, the improvement of existing lines by double tracking, building of new stations, etc., and the construction of new lines of about 1,000 miles in length and of a bridge over the Danube.

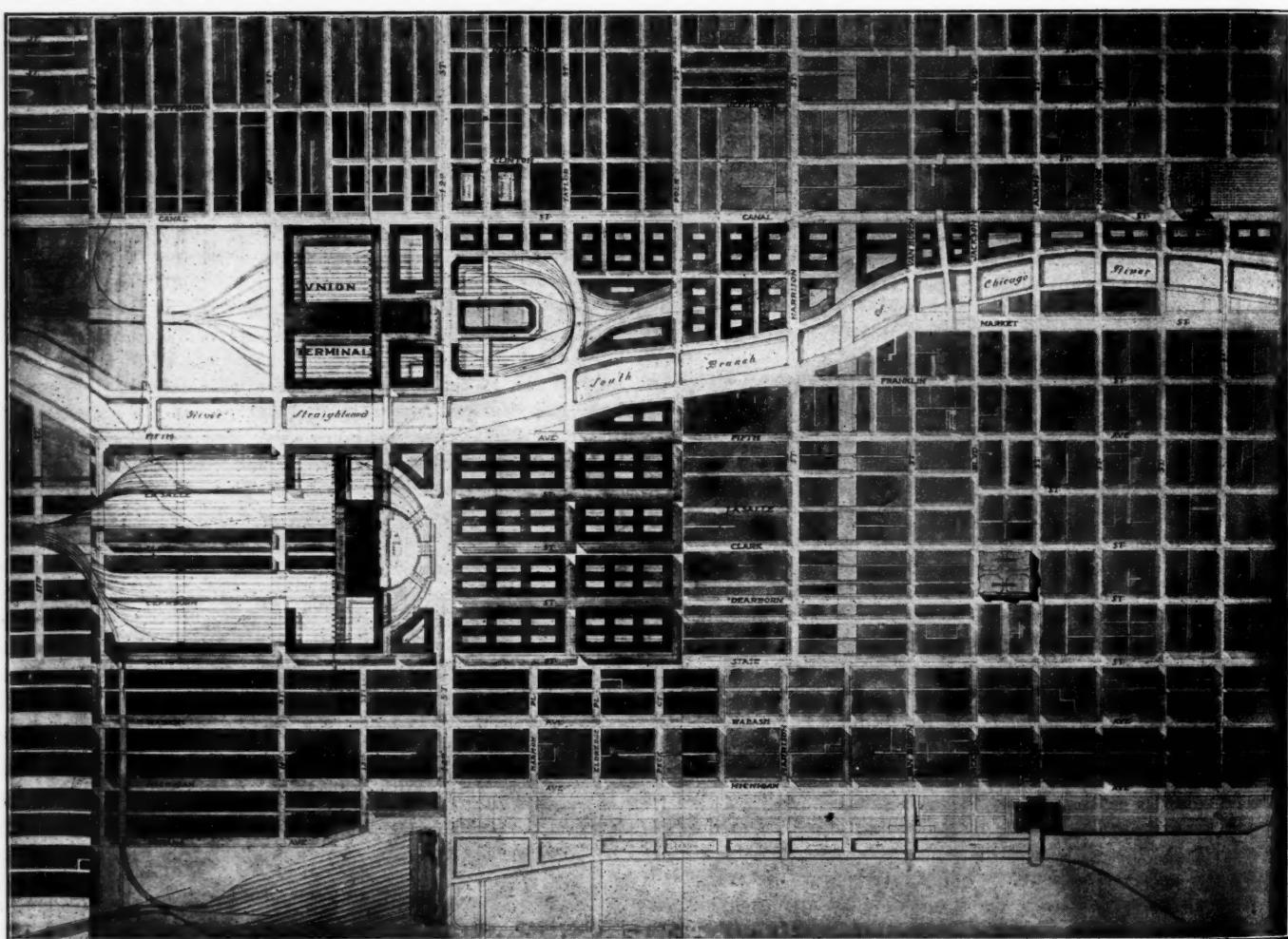
RELOCATING OF CHICAGO RAILWAY TERMINALS.

The Principal Features of the New Plans with Some of the Reasons for Rebuilding the Chicago Terminal District.

A new plan for the relocation and co-ordination of the railway passenger and freight terminal system of Chicago was submitted to the City Council Committee on Railway Terminals at a hearing on May 24 by the Chicago Plan Commission, a body appointed by the mayor to study and recommend means for the improvement of the city on the basis of a scheme prepared several years ago by a committee of the Commercial Club, known as "The Plan of Chicago." This new plan provides for a series of passenger terminals on the south side of Twelfth street in three units, one between Michigan avenue and the lake for the roads using the Illinois Central terminal; one between State street and the

using the Union station to change their plans for a new station to harmonize with the Chicago plan. It was submitted to the committee for their consideration in connection with a vigorous objection to the plan for the location of the new Union station between Jackson, Adams and Clinton streets and the river, as described and illustrated in last week's issue, which was declared "a distinct menace to the future welfare of the city."

The objection was not directed solely at the plan for the passenger terminal, but was based largely on the grounds that it contemplated a new freight terminal for the Pennsylvania Lines, to replace the present freight facilities on the



Plan of the Central District of Chicago Showing Proposed Three-Unit Plan of Passenger Terminals at Twelfth Street, Proposed Straightening of Chicago River and Proposed Development of Railway Property North of Twelfth Street for Warehouse and Business Purposes.

Chicago river for the roads now using the Dearborn and LaSalle street stations, and one between the river and Canal street for the roads now located west of the river and using the Union and Baltimore & Ohio stations.

The new plan was presented by Charles H. Wacker, chairman, and W. D. Moody, managing director of the Chicago Plan Commission, as "representing the best product of the efforts of the executive officers and the architectural and engineering staff of the commission, but not passed upon by the commission," pursuant to a resolution adopted by the Plan Commission after the failure of the efforts of its sub-committee on railway terminals to induce the roads now

site of the proposed Union passenger terminal, to be located between Jefferson and Desplaines streets, from Van Buren south to Ewing, and that the passenger and freight terminals together would constitute a "permanent impregnable Chinese wall" hemming in the expansion of Chicago's congested business district toward the west and south, besides preventing the carrying out of a comprehensive permanent plan for the railway terminals of the city as a whole. The plan is based mainly on the plans that have long been advocated by F. A. Delano, president of the Wabash, for a series of terminals on Twelfth street, and the proposals of the original plan of Chicago as drawn by D. H. Burnham. It includes the idea

suggested in the plan recently advocated by Jarvis Hunt for the straightening of a bend in the Chicago river between Twelfth and Sixteenth streets, but rejects his plan for one central terminal, and it places the new Union station on the west side of the river, while moving it back to Twelfth street, instead of requiring the railroads to cross the river to enter the station, as proposed by Mr. Hunt's plan. Instead of a central freight terminal at Sixteenth street, as proposed by Mr. Hunt, it provides for the use of railroad property north of Twelfth street for large freight terminal and warehouse buildings entered by tracks underground and for the opening of streets through territory now closed by railroad property.

The principal features of the plan, together with some of the reasons advanced by its framers as to the need for reconstructing the Chicago terminal district, are given in the following extracts from the report:

The report states that at present Chicago has a population of 2,250,000 people and a central business area of one-quarter of a square mile with a mixed fringe of business and warehousing surrounding it. It is estimated that this loop district is carrying today 60 to 70 per cent. of its ultimate business capacity, and that to provide for the business necessities of a population of 5,000,000 people at least 50 per cent. more area than is now in use will be required. The business district can grow southward only along three streets; it can grow westward and northward only after jumping the gap of the river and adjacent railroads, which ranges from 400 to 700 ft. wide on the north and from 1,100 to 1,500 ft. at Harrison street. It is declared that the history of cities shows that only under the strongest sort of pressure will business jump even the smallest gap.

"In order to bring about a more orderly development of business southward and a movement of business westward, it is necessary to remove the obstacles which are restricting and making the growth unshapely and disorderly. The terminals—freight and passenger—must either be removed altogether or else the areas which they occupy must be developed in such a way that they will become a magnet rather than an obstacle to business.

"The location of the river and of the railroads immediately adjacent has been a hindrance to the westward flow of business and the trend of the river eastwards and the presence of the railroads in long strips up to the loop has broken up and is preventing west of State street a solid movement southwards.

"For proper development to take place in the future in either of these directions, it will be necessary to overcome both of these forces which are operating to break it up and obstruct it."

Then follows a description of the street system of Chicago, showing the condition of imperfect and inadequate means of passage to and from the central district, caused by the location of the river, the changing of the street system south of Jackson boulevard to accommodate the railroads, and "improper development by the railroads of the property owned by them south of Polk street and the closing by them of streets."

"If business is to grow southerly and westerly," the report declares, "we must develop east and west streets south of Jackson boulevard, and north and south streets between Michigan avenue and Halsted street." The report then continues: "As a means, at one and the same time, for relieving restrictions on business growth, for improving the street system and for providing for the city railroad terminals which will be adequate for present needs, and which will provide for expansion in the future, it is proposed that all passenger terminals of the railroads be moved back to Twelfth street, that the river channel be changed from Twelfth street to Sixteenth street, and that the space occupied by the railroads north of Twelfth street be developed for freight-warehouse and wholesale occupancy.

"The movement of business can then be progressive and natural. It is immaterial, as far as business is concerned, what is under the street surface, and if all the railroad tracks be placed under ground business can flow over them without interruption. The lower part of the buildings can be used as delivery floors and the upper sections as offices and business houses. Along the river, west of the present business center, buildings can be built which in appearance will not differ in any way from business buildings. Loading to and from these warehouses can be done in courts over the tracks inside the buildings and the frontages along the streets can be used for stores if so desired. When business demands outlet to the west this occupancy will give place.

"It will be readily seen that most of these improvements, which are practically the only means of relieving downtown congestion, are bound up with and dependent on a complete rearrangement of railroad facilities, and lie for the most part on railroad property.

"The railroad passenger terminals as proposed are dependent on the straightening of the river. This is proposed from Twelfth street to Sixteenth street, and the new channel provided will be 200 feet wide. (This is an improvement recommended by the Harbor Commission and by the Sanitary District.)

RAILROAD TERMINALS.

"The passenger terminals should be accessible to all parts of the city. They should be reasonably close to the business district. They should be within easy reach of each other. They should be perfectly placed in their relation to the present and proposed transportation facilities. They should cause a minimum congestion on the streets in their neighborhood. They should not interfere with the growth of the business area. They should not be located so as to in any way obstruct or disarrange the street system. They should be as economical in first cost and operation as compatible with convenience and service to the public. Their operation should be noiseless and smokeless.

"Under the preferred plan Twelfth street should start from Michigan avenue, with the Field Museum and new Illinois Central station at its intersection with Michigan avenue, as a double-deck street, and continue as such to the river. West of Canal street it will be a one-level street. On the south side of Twelfth street, east of the river, it is proposed to provide business buildings and a station which centers on Clark street. This station will house the Lake Shore, Rock Island and Western Indiana group of roads. On the north side of Twelfth street there will be buildings which will have a combined utility of stores, offices and warehouses. West of the river, as far as Canal street, there will be on the south side of Twelfth street, the station building for the Union terminal group of railroads, with adjunct office development. On the north side of Twelfth street there will be offices or station building development. The above arrangement with the additions of the Illinois Central station proposed at Indiana street and Michigan avenue, will constitute a three-unit plan interrelated along Twelfth street.

"The Illinois Central-Michigan Central group will occupy their present station. The Western Indiana or Polk street station group, consisting of the Wabash, Grand Trunk, Santa Fe, Monon, Chicago & Eastern Illinois, Chesapeake & Ohio, and Erie will be united with the Rock Island-New York Central lines, or LaSalle street station group to occupy the large terminal centering on Clark street. The Union terminal group, consisting of the Pennsylvania, Burlington, Alton and St. Paul railroads, will receive the B. & O., or Harrison street station group, and occupy the terminal between the river and Canal street.

"The passenger terminal which it is proposed to place between State street and Fifth avenue, extended, will have its head house or terminal building centering on Clark street. In order to allow of the looping of trains, it is necessary to place this building 300 ft. south of Twelfth street. In front

of the head house and between it and the loop will be an open plaza at the level of Twelfth street viaduct. Into this plaza and to the entrance to the station are taken the street car tracks which run on the upper level of Twelfth street. All traffic coming to the station along this upper level will also be cared for there. Entrances to the station for both vehicles and street car passengers are provided on Clark street, Dearborn street, LaSalle street, and on the lower level of Twelfth street.

"Directly back of the station building and at the level of Twelfth street the plaza and the head house floor is placed the concourse with the incoming section to the left and the outgoing section to the right of the head house.

"Express and baggage buildings may be placed in the central area between the incoming and outgoing sections of the station and when the station is electrified the space under these buildings may be used for car yards and later made an addition to the station. Building development may take place over the whole station area as soon as electrification is complete. In order to relieve Twelfth street of as much station traffic as possible driveways are provided along each side of the head house which are connected independently of Twelfth street with Canal street to the west and by a bridge over the river with Fifth avenue and the plazas of the other terminal.

FREIGHT TERMINALS.

"It is proposed that all the railroad property north of Twelfth street not taken for passenger terminals and such of the station area as can be built over after electrification be developed as freight terminals with warehouse and wholesale offices on the upper floors.

"East of the river this area owned by the railroads and developed in this manner can be approached from the south by tracks which will pass under the station along the west line of the terminal. These tracks will pass over Wentworth avenue, south of Sixteenth street and the lower level of Twelfth street. At this latter point they will be at an elevation of about 6 ft. below Chicago city datum, or about 19 ft. below the normal street level of 13 or 14 ft. above Chicago city datum. As soon as the elevation of 6 ft. is reached, branch tracks will be run out from the main running tracks into each of the warehouse blocks which they will serve. Each of these warehouse blocks will have its own private teamway or driveway and all the loading and unloading will be done there.

"On the west side of the river it is proposed that the approach tracks to the passenger station from the north be placed under Canal street from Madison street to Harrison street so as to leave all the area between Canal street and the river north of Harrison street free for wholesale and warehouse buildings. This area has the advantage of providing rail and water connection.

"Tracks for serving the properties to the east of the passenger approach tracks will pass around the east side of the terminal of the Union terminal association, and then up through the center of this area or along the east edge close to the river. These tracks will be at an elevation of about 6 ft. above Chicago city datum.

"Tracks to serve the area lying between Canal street and the approach tracks to the passenger station will be carried between the west side of the terminal and Canal street.

"The former of these freight connections will serve the Pennsylvania and the Alton property and the latter the Burlington property.

"The property lying to the north of Van Buren street as far as Madison street between Canal street and the river is held by the Pennsylvania and proposed for the new Union terminal. It can still be held by them for freight warehouse and wholesale purposes, and the area now held by the Alton south of Van Buren street can still remain Alton property to be used for freight warehouse and wholesale purposes. This will be a more economical use of the property than would its use for passenger terminal purposes.

SUBURBAN TRAFFIC.

"The heavy lines of suburban travel are from the north and west over the Northwestern and Milwaukee, from the south over the Illinois Central, Rock Island, Lake Shore, Pennsylvania, and from the west over the Burlington. At present these lines of travel are grouped into travel leaving the center of the city from the west of the river, travel entering from the south and travel entering from the east. It has been one of the aims of this study of the railroad situation to care for this suburban travel and bring it as far into the center as possible, even though it has been thought necessary to place the terminals themselves at Twelfth street, and it is proposed to handle this class of travel in the following manner. The lines which use the Union terminal west of the river, and enter from the south will deliver their suburban trains on to tracks set aside for that purpose, which shall run along the west side of the terminal to Harrison street. From Harrison street to Madison street these tracks will be placed under Canal street and from Madison street they shall parallel the Milwaukee tracks to some point to the north of the loop, where there can be placed a loop where the trains can be turned or else a yard where they can be stored.

"The Milwaukee suburban trains, and at some time in the future, the Northwestern suburban trains can be handled in the same way, using the Twelfth street station or else running farther south to a loop or yard. In this manner the whole loop will be served by these lines, and it is apparent that a large amount of travel can be handled each way at the rush hours. It is proposed to handle the traffic on the lines which use the terminal east of the river in much the same way—that is, to bring it up to the north end of the business center. It is proposed to pass suburban traffic over the present tracks of the St. Charles Air Line from Clark street to the lake front. Thence it will use tracks on the Illinois Central right-of-way to the river, where a loop can be provided for use of both this traffic and of suburban traffic over the Illinois Central. This loop would undoubtedly be an advantage to this road and with it, it could handle the additional burden which is outlined.

"As an alternative of this, these suburban traffic lines might be brought into the center under ground to the present passenger stations, and there turned, or they might be carried north of the river to a run-around or yard.

"With this complete arrangement for suburban business, the center of the city would then be served at all points along its edges, and at no time would a second fare be necessary to get to the business district, as is the case in New York.

"The arrangement of suburban lines along the west bank of the river and along the Illinois Central right of way, with a loop north of Randolph street, would be flexible and economical for the railroads and a convenient solution for the public."

Then follows a detailed plan of connecting the railway terminals with the local transportation system of the city, surface and elevated railways and the proposed subway.

In presenting the plan to the committee Mr. Wacker severely criticised the Union station roads for ignoring the Plan Commission, and accused them of attempting to "railroad" their plan through the council without reference to the revised plan which was submitted to them on May 16. He argued that a comprehensive scheme must be worked out and the railways be required to co-operate if the business district of the city is to be allowed to expand, and that any plan that does not provide for expansion to the west and south, and the reclamation of a part of the central territory now occupied by railway tracks should not be encouraged. Of the quadrangle bounded by Twelfth street, Halsted street, Chicago avenue and Michigan avenue, which the plan of Chicago proposes to make the central business district of the city, he said that 32.5 per cent. is owned by the railroads, and that if the Union station roads are permitted to retain

their present location all hope of inducing competitive roads to move their stations back to Twelfth street must be abandoned. To provide for proper expansion additional streets must be opened up east and west and north and south, as provided by the plan, including a new main east and west artery or "civic axis" on Congress or Harrison street, leading to a civic center at Halsted street, where it is proposed to erect a city hall at the point of convergence of several main diagonal streets which penetrate the northwest and southwest sides of the city.

The plan for the proposed freight terminal of the Pennsylvania lines, as described by E. R. Graham, architect for the Union station roads, contemplates an architecturally attractive head house facing on Van Buren street, a warehouse building occupying the block from Van Buren to Harrison street, and a loading and unloading platform in the block south of Harrison street, between Jefferson and Desplaines streets. The terminal would be approached by four tracks south of Twelfth street, and two tracks north of that street at an elevation of from 20 to 27 ft. above the street level. This would provide for the handling of all package freight designed for local consumption. Loading and unloading would all be done entirely on the property of the railroad, and five entrances to the loading and unloading platforms would be provided in one block. Tall masonry walls would border the tracks along their entire length, so that the freight cars would be out of public view.

F. A. Delano, president of the Wabash, sent a letter to the committee at the hearing on May 23, criticising the plan of the roads for the Union station, and also addressed the committee at the hearing on May 24. He said that many features of the Pennsylvania plan were bad, as tending toward the restriction of the business district instead of providing for its expansion. He opposed the change in the proposed civic axis of the city from Congress street north to Jackson, saying that the growth of the city was toward the west and southwest, and he objected to allowing any tracks over the streets north of Twelfth street. He advocated no particular plan, and admitted there were many difficulties in the way of getting all the roads to agree on a general scheme, but thought the committee was in a position to refuse its sanction to any project that did not tend toward a solution of the whole terminal problem. He therefore suggested that a final decision on the plan proposed by the Union station roads be deferred a few months, and that the engineers of the various roads get together in a conscientious effort to work out the problem in a co-operative way. The adoption of the Union station roads' plan would mean, he said, that nothing would be done by the other roads toward working out a general solution, whereas he was sure that the Rock Island and Lake Shore would agree to move back to Twelfth street if a satisfactory plan is evolved. If all interested would place their cards on the table perhaps a better plan than any yet suggested could be worked out.

The plans for the Union station announced by the Pennsylvania Lines, the Chicago, Burlington & Quincy, and the Chicago & Alton were endorsed by the Chicago Real Estate Board at a meeting on May 22, by a vote of 95 to 10. They have also been approved in resolutions adopted by the people of several suburbs served by the Union station lines, and by a large number of west side property owners who have appeared at the various hearings and protested against any plan of locating the proposed terminal on Twelfth street. A large number of prominent business men have also written to the committee or appeared at the hearings, expressing a preference for the Union station lines plan over the Twelfth street plan, and particularly over the Hunt plan for a central terminal, while a few have expressed a preference for the latter or some other plan. The Chicago Building Trades Council submitted a resolution urging the approval of the Union station plan on the ground that it would give employment to a large number of men.

At a hearing on May 26 an entirely new plan was submitted

to the committee by Irving K. and Allen B. Pond, architects. This scheme provides for a series of terminal units between Canal and Clinton streets, paralleling the river, extending from Madison street south to Twelfth street, and connected by a series of elevated tracks, on two levels, one for through trains and one for suburban traffic, operated on the loop principle with the stations inside the loop. This terminal system would accommodate all roads except the Illinois Central, and it was suggested that the Union station roads could build their proposed passenger station in approximately the present location, as the first unit.

At the meeting of the city council on Monday night three ordinances were presented on behalf of the Union station roads to provide for necessary street and alley changes in connection with their terminal plan.

An enabling act to provide for the incorporation of a holding company to construct the Union station, with a capitalization not to exceed \$50,000,000, was passed by the Illinois legislature on May 22, after assurance had been given by the railways that they would pay to the state the full fee for such incorporation instead of incorporating under the "not for profit" act.

RAILWAY TELEGRAPH SUPERINTENDENTS.

The thirty-second annual convention of the Association of Railway Telegraph Superintendents was held at St. Louis, May 20, 21, 22 and 23, with over 200 members and ladies present, and President J. B. Sheldon in the chair. At the opening session Belvidere Brooks, vice-president of the Western Union Telegraph Company, spoke briefly, referring to the importance of harmonious relations between the telegraph company and the railway telegraph superintendents, and to the problems that were constantly arising for solution. The auditing committee reported total receipts of \$1,972 and disbursements, \$1,377, leaving a balance on hand of \$595. Secretary P. W. Drew announced that the association now had 200 members, active and associate. A large number of new active and associate members was elected.

The Committee on Wire Crossings, G. A. Cellar, chairman, presented a report which, with a few amendments, was adopted; and the specifications embraced in it were ordered to be submitted to the American Railway Association.

A committee, E. P. Griffith, chairman, reporting on "Form for Delivery of Telegrams to Trains," advised that a universal system for making such deliveries or reporting non-deliveries would be impracticable. A paper on telephone transmission, by Elam Miller and C. A. Robinson, was read in abstract by Mr. Robinson and discussed by M. H. Clapp.

The next paper, entitled, "Use of telephones by railroads for despatching trains, and for messages," by J. C. Johnson, of the Pennsylvania Railroad, was read by I. C. Forshee, electrical engineer of that road. This paper is abstracted in another column. It brought out a long discussion, which was participated in by Messrs. William Bennett, Charles Selden, E. P. Griffith, W. J. Camp, C. S. Rhoads and others. The cost of way station telephone equipment was the subject of special interest to the members. Reference was made by various speakers to the value of concrete telephone booths.

On Wednesday morning P. J. Howe (W. U. T.) read a long paper on inductive disturbances. A. Wray, of the Rock Island road, said that the best means of insuring that lines shall be clear of inductive disturbances from power lines is to keep away from them. On his road harmonic ringers are used. These respond to alternating currents of different frequencies. This method of party line ringing is very successful. By its use any one of four parties may be called on a metallic line, or any one of eight called by ringing to ground from each side of the metallic circuit. He suggested that it might be possible to design relays that would respond only to the frequency for which they were built and in this way

make telegraph circuits free from inductive disturbances from parallel power circuits.

N. E. Smith (N. Y. N. H. & H.) gave some experiences as a result of induction from the single phase 11,000-volt traction system of his company, which he thought had no equal. He gave a detailed account of the efforts to overcome inductive disturbances, and the satisfactory results obtained.

M. H. Clapp (N. P.) presented a paper on protection against lightning, which was discussed by I. C. Forshee (Pennsylvania) and others. Mr. Forshee described the methods of protection employed on his road. R. E. Chetwood (W. U. T.) said that railroads spent much money on protective apparatus and failed to get the results expected because of poor grounds. It was hard to devise any standard method of making grounds. The best way is to drive pipes in the earth and use salt. If necessary drive several pipes and connect them in parallel. Vacuum lightning arresters, he stated, could not always be relied on. Their efficiency depended upon the vacuum, and the word of the manufacturer was the only guarantee that could be obtained as to this. His company is to introduce a new type of cable box which will be an improvement on the present type.

At the afternoon session, R. F. Spamer (Western Electric Company) read a paper on "Main line power for selective circuits, including transmission and signaling." In the discussion on this E. C. Keenan read a communication from C. S. Rhoads, Jr., engineer of the Hall Switch & Signal Company, New York, in which it was stated that there are points other than first cost, depreciation, etc., which must be considered in the choice of battery supply for selector circuits. The human element, he stated, was a strong factor. Reliability is what is desired, not cheapness. Storage battery gives excellent results when properly maintained, but it has disadvantages. Dry battery has some excellent points in its favor. It can be installed and maintained by any inexperienced man. No reserve battery is absolutely necessary, and the first cost is reasonable. Primary cells, he said, are almost beyond consideration for railroad telephone service, except for certain specified uses. Chemical rectifiers are slow to come up to voltage after being idle. This fact is against them for main battery purposes. Motor-generators give reliable service and require very little attention. E. E. Hudson (Thomas A. Edison Co., Orange, N. J.) called attention to the reliability and low maintenance costs of primary cells.

H. D. Teed, superintendent of telegraph of the St. Louis & San Francisco, read a paper on the full use of wires, describing various improvements which have been made on his road. The first essential in getting full service out of all wires on a large system is to have an energetic manager and a wire chief, supplied with the necessary testing instruments—voltmeter, ammeter and Wheatstone bridge—who will appreciate their responsibility and the value of the property whose efficiency is in their hands. In adopting telephones, it was the policy on the Frisco to use them everywhere that economy could be effected. If good for despatching, telephones should be also good for messages; and it follows that the great volume of correspondence which burdens most railroads can be reduced also. From the headquarters of this road at Springfield, Mo., lines radiate in six different directions; and on four of these lines message circuits have been installed as well as despatching circuits. The message circuit and the despatching circuit together are used to make a phantom circuit for through business, and this has been very successfully carried out. The arrangement of the phantom circuit cost only \$800, and it takes the place of an expenditure of \$143,000 which would have been necessary if a separate new line had been put up. On all of the message circuits the signaling is done by monitor operators at Springfield. The Frisco makes extensive use of telephone instruments, to talk by telephone over telegraph wires, but only for moderate distances.

In the discussion of Mr. Teed's paper, R. F. Finley (N. Y. C.) reviewed the work done and what is proposed on the New York Central lines in the West in order to obtain the full use

of facilities. M. H. Clapp, A. B. Taylor and others took part in the discussion, after which M. C. Allen, of the Western Union at New York, read a paper entitled "Organization for Maintenance of Lines."

On Thursday the paper of Mr. Allen was discussed at length by G. A. Cellar, A. B. Taylor, C. S. Rhoads, W. J. Camp and others, all of whom commented favorably on the practicability of the plan outlined by Mr. Allen. Mr. Cellar stated that he saw no reason why the organization described by Mr. Allen would not apply to railroads as well as to telegraph and telephone service.

J. F. Richardson (C. P.) read the paper of J. B. Sheldon, entitled "Organization for Wire Chiefs and Telephone Inspectors." W. J. Camp, A. B. Taylor, J. F. Caskey and others described the methods in vogue on their respective lines, and a general discussion ensued.

At the afternoon session amendments were made to the by-laws providing that hereafter only one meeting of the eastern and the western divisions be held annually, instead of two, and that the officers of the divisions be elected at the annual general meeting. The eastern division will hold its annual meeting in November, and the western division in March. Additional meetings can be called on the application of five members.

The committee on "Preparing Uniform Rules for Train Orders by Telephone," through Chairman L. M. Jones, of the Santa Fe, Topeka, Kan., reported progress.

At the session of Friday morning officers were elected as follows: President, William Bennett, Chicago & North Western, Chicago, Ill.; first vice-president, A. B. Taylor, New York Central Lines, New York; second vice-president, N. C. Walstrum, Norfolk & Western, Roanoke, Va.; secretary and treasurer, P. W. Drew, Minneapolis, St. Paul & Sault Ste. Marie, Chicago, Ill.

New Orleans was selected as the place, and May 19, 20, 21 and 22 the time for next year's convention. W. H. Potter, Southern Railway, Washington, D. C., was elected chairman of the eastern division, and Mr. E. C. Keenan, New York Central Lines, Chicago, chairman of the western division. After the installation of the new officers the convention at 11:45 a. m. adjourned.

SHIPERS AND THE ADVANCE IN FREIGHT RATES.

The Railway Business Association has published in Bulletin No. 13 its arguments in favor of freight rate increases for the eastern roads. The association urges railroad managers to confer directly with shippers and says that industrial and traffic bureau representatives should have sanction from their employers for a liberal attitude. The bulletin starts with the following statement signed by the president of the association:

"Fight" is not an appropriate name for the new effort of the eastern roads to raise freight rates. There isn't any fight about it. It is a conference. Antagonism to railways has subsided. Regulation of rates is complete. Confidence in the Interstate Commerce Commission is thorough. The public views the situation with equanimity. Shippers, consumers, the press and everybody else are obviously content that the roads should make their showing if they can and get the advance if they need it.

This is progress. It is vastly more important that railway questions shall be settled in good temper than that any particular rate case shall be decided any particular way. It is to be hoped that the country has seen its last "fight" over freight rates.

The Railway Business Association presents in this bulletin two exhibits. One is that the railroad share of total new securities issued has been declining sharply until it was in 1912 the lowest of the decade, while other corporations were

issuing their highest. The other is a number of extracts from representative newspaper editorials breathing a spirit of willingness to consider the proposed advance without prejudice. These two exhibits taken together signify first that there is something the matter with railway credit upon which railway ability to serve the country adequately depends, and second, that whatever is the matter the country wants the Interstate Commerce Commission to find a remedy, in which there will be general and cheerful acquiescence.

In that frame of mind no nation is apt to make a serious mistake. The country is to be congratulated on having emerged into an era of calm thinking and good feeling with regard to transportation.

GEO. A. POST,
President, Railway Business Association.

The exhibit in regard to the need for higher rates and the small amount of new securities issued by the railroads is substantially as follows:

Applying for the reopening of the advanced rate case of 1910, the eastern trunk lines are about to go before the Interstate Commerce Commission and endeavor again to show need for larger revenue.

Lessons learned three years ago by all concerned should, and we believe will, make possible at this time a procedure distinguished by good feeling, by earnest purpose to ascertain what is the highest public interest and by conference and co-operation for the best results.

It is necessary that the railway managers should demonstrate their need. It is desirable that shippers and the public shall appreciate the burdens of cost which have been and are being laid upon the roads, the greatness of the task which the roads must perform to meet their obligations to the public and the generous allowance which ought to be provided for doing, on the higher scale of operating cost, the vastly greater things demanded by the miraculous growth of our agriculture, commerce and industry. Shippers and railroads can aid the commission substantially by endeavoring to reach agreements as to the schedules and the traffic upon which the increases, if any are to be granted, should fall.

The Railway Business Association is not a party to rate cases and will not discuss the schedules involved in this proceeding. Being, however, deeply interested in the welfare of the roads, which are the customers of our members, and having on general grounds as business men and citizens an earnest desire to promote enlightened methods of solving railway questions, we regard it as our function to encourage the fullest ascertainment and employment of pertinent facts. It would be possible for anyone desiring to resist advances otherwise than on the merits to make prominent at such a time past railway practices which have been criticised and alleged current shortcomings of individual companies susceptible of an interpretation injurious to the roads. Such attacks, indulged in at the hearings or through the newspapers, though foreign to the question whether the roads with existing revenue and under existing conditions can perform service adequate to the public need, might complicate the already difficult task of the commission and result in national injury.

We urge all those who discuss the question to deal in authentic information bearing directly on the merits. We ourselves shall invite attention to such facts as we feel competent to obtain.

Our study of the credit situation of the roads gives a result so striking that in our judgment it should arrest attention and demand consideration. The generally accepted authoritative record of listings on the New York Stock Exchange is the file of the *Commercial and Financial Chronicle*. That publication presents early in each calendar year a table giving new securities listed during the year preceding by all corporations, classifying railroads separately. For all corporations the *Chronicle* of January 25, 1913, page 241, gives a table covering a series of ten years, from which, adding stocks and

bonds together and segregating steam railroad from all other corporations, we get the following:

Year.	Total.	NEW SECURITIES LISTED.		R. R. Percent- age of Total.
		Non-Railroad.	Railroad.	
1903....	\$1,008,179,095	\$511,404,695	\$496,774,400	49.2
1904....	710,946,400	246,994,350	463,952,050	65.2
1905....	1,513,461,550	797,954,750	715,506,800	47.2
1906....	1,234,667,950	680,753,900	553,914,050	44.8
1907....	996,845,050	582,102,250	414,742,800	41.6
1908....	1,386,885,450	680,222,850	706,662,600	50.9
1909....	2,424,482,585	911,473,770	1,513,008,815	62.4
1910....	2,047,664,045	1,241,830,885	805,833,160	39.3
1911....	1,224,449,230	721,555,780	502,893,450	41.0
1912....	1,816,008,540	1,470,221,540	345,787,000	19.0

An analysis of this table shows that from 1903 to 1909 inclusive, the steam railroad share of total issues of all corporations listed on the New York Stock Exchange fluctuated until 1909, when it was 62.4 per cent., the highest of the decade except 1904. After 1909 there was an annual drop in the amount of railway securities issued. In 1912 railroads issued only 19 per cent. of the total for all corporations, and this was the lowest percentage and the smallest amount for any one of the ten years.

In 1909 there were listed by all corporations issues aggregating \$2,424,482,585. Of this total steam railroad corporations put out \$1,513,008,815, leaving for other corporations \$911,473,770.

In 1912, all corporations issued \$1,816,008,540, of which steam railroads issued \$345,787,000, leaving for other corporations \$1,470,221,540.

In 1909, therefore, the railway securities issued were \$601,535,045 more than the non-railroad, and in 1912 the non-railroad securities issued were *more than four times the railroad securities*.

The securities put out by railroads in 1909 were 62.4 per cent. of the total for all corporations.

If this ratio had been maintained in 1912 the railroads would have issued in that year \$1,133,189,328, or *more than three times* as much as they did issue.

This decline in railway issues was persistent year by year since 1909. Corporations other than steam railroads issued in 1909 securities aggregating \$911,473,770, in 1910, \$1,241,830,885, in 1911, \$721,555,780, and in 1912, \$1,470,221,540. Steam railroads issued in 1909, \$1,513,008,815, in 1910, \$805,833,160, in 1911, \$502,893,450, and in 1912, \$345,787,000.

In other words, corporations other than steam railroads have issued since 1909 securities showing an increase in every year excepting 1911, whereas the steam railroad issues have declined in every year since 1909. The non-railroad issues in 1912 were \$558,747,770 more than they were in 1909, while the railroad issues in 1912 were \$1,167,221,815 less than they were in 1909, a falling off of 337.5 per cent.

"RELIEF MUST COME"—PROF. RIPLEY.

So independent an authority and careful investigator as William Z. Ripley, Professor of Economics at Harvard University, accepts as sufficient the fact that "Today the Chicago, Milwaukee & St. Paul cannot sell its 4½ per cent. bonds at par," and declares:

"Relief in the form of rate advances must come. Unless relief does come from that source, the public is going to be denied the facilities and the accommodations to which it is justly entitled."

Many executives of industrial enterprises whose annual freight bills are the largest have for some time felt the danger that a breakdown of transportation facilities would cause them losses a hundred fold greater than any advance in freight rates which the roads were likely to file or the commission sanction. These matters are ordinarily left in the hands of experts whose specific job is to keep rates down. This occasion calls for first-hand study of the problem by heads of concerns.

It was evident after the hearings in 1910 that able and influential traffic experts looked forward to another such proceeding determined to contribute all they could to a friendly atmosphere from which appeals to popular prejudice

should be banished and in which the common purpose should be to reach a wise result.

Traffic representatives of shippers and of business bodies are entitled to have at this time the assurance that those who employ them are cognizant of the situation and will appreciate the reason why the presentation of the carriers' case is scrutinized in an amicable rather than in a hostile attitude.

To the commission above all is it due that public sentiment shall seem broad and farsighted. There is no precise point at which the rate from New York to Chicago can be fixed as the only reasonable and equitable rate. What would be a wise rate if the railways had developed their facilities in advance of the traffic might not be at all an adequate rate if facilities had lagged behind and the public wanted the roads to catch up and resume leadership.

In the case at bar facilities have lagged behind. Even with the mild weather and unprecedented co-operation of shippers and railroads to expedite car movement in the fall of 1912 the net car shortage rose to 51,102, and the gross number of cars asked for and unavailable to 73,745. A winter of normal severity would undoubtedly aggravate this situation into a serious and perhaps a disastrous congestion. Traffic has grown faster than facilities.

Does the public want the roads to overtake traffic and go on ahead as in the past?

This is for the public to say, and it is a perfectly proper function of administrative statesmanship for the commission to heed public demand on that point.

We take it for granted that the railway managers will offer shippers the frankest explanation of the situation and arrange opportunities for the fullest exchange of views. We are confident that the public now understands much more thoroughly than three years ago the increased operating cost which has been imposed upon the roads by wage arbitrations and by outlays compelled under federal and state statutes, and appreciates much more vividly the expensive undertakings which confront the roads in the enlargement of terminals, mostly in the heart of large cities where land-cost is highest.

This diffusion of knowledge gives reason to hope that the public will consider the new application for rate advances on the merits and without prejudice.

MASTER BOILER MAKERS' ASSOCIATION.

The seventh annual convention of the Master Boiler Makers' Association was held in Chicago, May 26 to 29, President M. O'Connor, general foreman boiler maker, Chicago & North Western, presiding. John H. Smythe, Parkesburg Iron Company, made the opening prayer. Addresses were then made by W. L. Park, vice-president of the Illinois Central, and John F. Ensign, chief boiler inspector, Interstate Commerce Commission.

W. L. PARK'S ADDRESS.

I shall take advantage of this opportunity to endeavor to point out the way in which your association can be helpful to the railroads by discussing the tendency of laws affecting your craft, thereby assisting the operating department of which your railroad membership is a part, in correcting certain abuses of the railroads that are insidiously creeping into our national and state jurisprudence.

There are being inflicted upon the railroads numerous laws, rules and regulations, some of which have real merit, many of which, however, are ill-considered, ill-advised, inconsistent, unnecessary, unreasonable and impossible of compliance. They are born in ignorance of the existing conditions, not always sincerely in the interests of the safety of the public or the employees of the railroad. There is frequently to be observed in their proposal a taint of commercialism or self-interest. The railroads cannot, therefore, be justly criticised for being on the alert to safeguard their interests and to see that the public who pay the bills are not imposed upon. A proper and reasonable

regulation of our railroads is necessary. The public may be easily misled, and is very apt to be, if those who are employed upon the railroads are not keenly alive to passing events and zealous in protecting their employer—the stockholder—from the effect of unnecessary and expensive regulation.

There is unquestionably a sincere disposition on the part of the administrative part of our government to be reasonable; it is not their intention or desire to be otherwise. They, however, do not make the laws. Once placed on the statute books they have no other course but to enforce them. If railroad men are asleep at the switch and permit obnoxious laws to be passed, they must content themselves thereafter with the best possible observance until they can be modified or repealed. To change laws once passed is extremely difficult. The advisable course is to oppose them vigorously at their inception and continually until killed or harmlessly amended. Expert knowledge will remove the fangs from almost any venomous measure.

The difficulty in opposing adverse legislation is in invoking this expert assistance continuously as well as at the critical time. So called "efficiency experts" who do not know a gusset sheet from a crown sheet, or a hydraulic shear from a press, or the completed boiler from an air reservoir, are on hand before and after to explain the deficiency of present practice, and pneumatically exploit some hobby that would work out if the railroads were compelled by law or regulation to adopt their scheme. The good laws we should approve and improve.

It is natural that we should, on this occasion, discuss first the rules and instructions for inspection and testing locomotive boilers and their appurtenances as authorized and required by the Act of Congress approved February 17, 1911. We have now had an opportunity to observe the working of this law for nearly two years. In referring to the report of the chief boiler inspector for the first year, I am struck with the apparent lack of instructions and failures to make systematic tests on the part of the railroads. Not until after the inspection bureau was organized did the railroads get together on uniform rules. There is no doubt, so far as I can judge from Mr. Ensign's report, of the advisability of a boiler inspection law. The law if reasonably applied can apparently work little hardship.

The great bulk of the defects are broken staybolts, tell-tales stopped up, plugged flues and unclassified steam leaks, few of which would make the locomotive unserviceable or unsafe. The report records only three explosions during the year which, out of a total of some 65,000 locomotives in use, speaks well for the efficiency and carefulness of our master boiler makers and their assistants.

The inspectors should be met with in a co-operative spirit, and every facility afforded them to do their work properly. The intelligence, knowledge and ability of the railroad master boiler maker is at least equal to that of the federal inspector, and the higher plane upon which you establish your reputation for honest effort to co-operate with the law, the greater will be the respect for and deference to your judgment when a dispute arises over the inspection of an engine.

While we have perhaps less to criticise in connection with the boiler inspection law than many of the others of recent mintage, the fact must not be overlooked that it, as well as those of similar import, entail additional supervision and a duplication of labor adding heavily to the financial burden of the railroads.

The public must be kept fully advised of this, as they pay the bills. If there is to be added to the cost of operation refinements that have not heretofore been considered necessary, the cost of service must inevitably rise. As you are aware there has been created comparatively recently great additional expenses incident to hours of service, standardization of equipment, air brake requirements and those relating to safety appliances, none of which in any way add to the efficiency of the service, but very materially interfere with and impede traffic; nor do operating officials generally admit that they noticeably affect the safety of trains, at least not to any extent greater than would have been the natural evolution of good practice.

The sequel has demonstrated conclusively that accidents are not in this way prevented or decreased; the money could have been much better spent for more permanent track, block signals, grade separation, interlocking, stronger equipment, safer shop conditions and modern tools and appliances, and in many other ways well known by practical railroad men, to be efficacious in the prevention of accidents.

"Safety to the employees and to the public" is made a cover for all kinds of class legislation, and is being worked day and night to this end. I am glad to testify that there is coming about a desire on the part of government officials to confer with those who are responsible for the expenditures, and to get at both sides of these questions, which is encouraging.

There are many other laws pending, which I would like to bring to your attention had I the time. The so-called "full crew bill" is the most pernicious. It is entirely unnecessary. Where it is made a law it becomes a dead letter, as it is utterly impossible to comply with it and satisfy the patrons. It is simply an outrage on industrious people and an insult to railroad management. The headlight law is unnecessary legislation in behalf of those who have a certain system of lighting.

If the railroads are not used as a means to promote private or class interests; if they are made better and safer and permitted to earn enough to provide for the convenience and safety of employees, as well as the public, we are all benefited.

I. F. ENSIGN'S ADDRESS.

Mr. Ensign called attention to the moral obligation of the boiler makers, not only to their employers but to the general public, by being sure that the locomotive boilers are in an absolutely safe condition before they are sent out on the road. He emphasized the importance of having men perform the inspections who thoroughly realize the importance of their work, and who would insist that the necessary repairs be made before the engine was allowed to be used.

He favored the placing of a boiler maker in charge of all work done on a boiler, such as the installation of the various boiler appurtenances. From July 1, 1911, to December 31, 1912, 16 deaths and 1,383 injuries were due to the failure of these appurtenances, which could have been easily repaired had they been given the proper inspection.

The effect of the boiler inspection law has been to make the railroads more careful in the inspection and maintenance of their power with a noticeable decrease in engine failures on some roads. It was also stated that during the last nine months over 4,000 locomotives have been ordered from service without any appeal to the chief inspector by the affected roads.

PRESIDENT'S ADDRESS.

Mr. O'Connor spoke of the responsibility of the boiler maker, urging the members to carefully study the difficult problems that frequently arise in the work of boiler construction. In speaking of the apprentices he said: "We should do everything we can to encourage and help them and by their examples they will lead other men who are selected to fill their places, if only they are taught to show that mental culture on moral and mechanical ideas is a pleasure to them as well as a duty."

REPORTS OF SECRETARY AND TREASURER.

The secretary reported a total membership of 415, with 313 in good standing. Sixty-eight applications for new members were received the first day of the convention. The treasurer reported a cash balance of \$441.67.

MR. SELEY'S ADDRESS.

C. A. Seley, president of the American Flexible Bolt Company, addressed the convention Tuesday morning. Speaking of railroad legislation he emphasized the statements made by speakers on the first day of the convention concerning the civic duty of the railroad employees and suggested that the members advise their representatives concerning intended laws which especially concern their work. Railroads are the only corporations that

have government regulation without being allowed to set the price of their products and should have the employees' co-operation. He mentioned the efficient way in which the boiler inspection laws are being enforced.

MIDWAY SUPPORTS FOR BOILER TUBES.

J. A. Doarnberger (N. & W.), chairman of the committee, presented the report and spoke of the general tendency toward the longer tube, the greatest length being 24 ft. when 2½ in. tubes were used and 22 ft. for the 2 in. tube. The 22 ft. tube does not seem to require the intermediate support, the buoyancy of the water being sufficient to support the tubes between the tube sheets. While there have been intermediate supports applied experimentally they were of such design as to make the removal of the tube an expensive and difficult proposition.

A good rule deduced from tests and experience shows that so long as the length of tube does not exceed 110 diameters (outside measurements) satisfactory results may be obtained. Good results have been reported from the 24 ft. tube, 2½ in. diameter, with the intermediate support, but the difficulty of removing the tubes still remains; while tubes of this diameter have been installed without the support there is no available data as to the results. The two prime objections to the long tubes are, first, their manufacture, and second, the efficiency of their supports and the retardation of the gases. While the long tubes receive material support from the water they are liable to spring leaks when the boiler is hauled over the road empty.

It was also shown that while other parts of the locomotive have been improved, the rate of combustion being increased, etc., the general arrangement of the tubes in the boiler, the methods of application and the treatment thereafter are substantially the same as they were 25 years ago. The question of intermediate supports is not to be regarded as an impracticable, or an unnecessary arrangement; on the contrary, the idea seems to be good, but it introduces the difficulties of interference to circulation and to the removal of the tubes, both of which are serious.

While some designers are going to the above limits in lengths of tubes, the adoption of the combustion chamber has affected the situation. Dr. Goss in his report on the tests of the Jacobs-Schupert and radial stay boilers, made at Coatesville, Pa., has shown that while the ratio of heat absorbed by the flue varied with the length of the flame, which might be accepted as a function of the fuel, the rate of heat absorbed per foot of heating surface by the firebox to that absorbed per foot of total heating surface, with a moderately long flame bituminous coal, is as 6.15 to 1. The combustion chamber will therefore undoubtedly find more favorable consideration than in the past, especially since some of the objections to it seem to have been removed by changes in boiler design.

Discussion.—Most members found little difficulty with long as compared with short tubes. Long tubes are more likely to leak on account of the greater expansion. Midway supports are objectionable because of difficulty in removal of tubes, poor circulation of water, and the inclination to cut the tubes because of vibration. The method of arching tubes to allow for expansion by deflecting the tube sheets one-eighth inch while the tubes are being installed is not considered good practice.

UNSAFE CONDITION OF A BOILER.

A committee, of which E. W. Young, Interstate Commerce Commission, was chairman, presented a report on "When is a Boiler in a Weak and Unsafe Condition?" in which were mentioned as the causes of boiler trouble the faulty and defective design, poor material, poor and careless workmanship, improperly made repairs, bad water and improper care. Among the contributory causes were mentioned the rigidity of construction which would not allow for free expansion and contraction; this might be caused by too rigid staying and the improper location of the stays.

A well designed boiler should have every part of the same strength at all temperatures, and so placed that adjacent parts

will expand and contract together under all conditions, and will not work against each other.

A poor and careless workman may cause many defects, not only from poor workmanship but by using improper material. Repairs to boilers are very important and should be carefully made. Bad management is the chief source of boilers getting in a weak and unsafe condition. All troubles can be discovered before becoming dangerous by careful, painstaking and competent examinations.

Discussion.—The ends of sheets should be carefully shaped when rolled. In case of a red hot crown sheet bank the fire and get water into the boiler as soon as possible to harden sheet. It is not necessary for the boiler to cool down before introducing the water.

WELDING SUPERHEATER FLUES.

It was the opinion of the committee reporting on this subject (B. F. Sarver, Penna., chairman) that all safe-ending should be done at the firebox end, thereby always having good and new material at the place it is most needed. It is necessary to keep these large flues tight at all times to obtain successful results. The demands on a superheater flue at the firebox end are as great, if not greater than on an ordinary tube, and under some conditions, such as bad water and the failure to keep them absolutely clean, they are very liable to give trouble and require considerable work to keep them tight. There should not be more than one weld in these flues at any time, as old welds will give trouble. To do this it is necessary when safe-ending to cut the tubes as close to the tube sheet as possible; the first end should be 5 in. long, the second 8 in., the third 11 in. and the fourth 14 in., which is possible with the average flue welding machine.

The flue with the safe-end attached is heated in a furnace arranged to give a narrow flame on the joint to be welded. When at a welding heat the flue should be bumped against a water cooled iron block, inserted in the rear wall of the furnace, which will practically weld the tube while in the fire. It should then be placed on a welding machine which revolves around the tube. With such a machine the weld is made much quicker than in the machine that requires the tube to revolve, but it is claimed that the first type of machine will not leave a smooth finish on the inside which will cause the flue to clog rapidly. Also it is found hard to keep the two parts straight. The committee did not report as to which was the best type of machine and recommended further consideration of the subject.

Discussion.—Most of the members weld the superheater flues the same as smaller tubes and with good results. Some have safe-ended the front end of the tubes with good results, but the firebox end should be safe-ended where possible. Rollers are best for welding although the pneumatic hammer has been found satisfactory. Trouble has been experienced with a cold mandrel cooling the tube when welding.

EFFECT OF SUPERHEATERS ON THE LIFE OF FIREBOXES AND FLUES.

C. L. Hempel (U. P.), chairman, reported that the committee had gathered information from several railroads having engines equipped with superheaters of the Baldwin, Vaughn-Horsey and Schmidt type, the steam pressure ranging from 165 to 200 lbs., and that the committee is unable to find any well founded claim to show that superheating of steam has a detrimental effect upon the fireboxes or flues, but, to the contrary, it is shown that the life of the fireboxes and flues is prolonged considerably, from the fact that where steam is superheated the working pressure is reduced. However, there are many large engines carrying 200 lbs. working pressure with superheaters that show no ill effect on fireboxes or flues.

Discussion.—The superheater increases the life of the firebox due to lower boiler pressure and less water evaporated. One member reported a failure of a superheater pipe on account of its damper not being used. General opinion favored the use of the damper. Welding the superheater tube end in the firebox increases the life.

MR. QUAYLE'S ADDRESS.

Robert Guayle, superintendent motive power and machinery, Chicago & North Western, addressed the convention Wednesday morning. He urged the members to participate more freely in the discussions and to bring new ideas to the convention each year. They should know just what kind of material was being used in the shop, and what was the best material for each purpose. Information along these lines should be sought for in books and from experts. He commented on the ill effects of punching sheets and predicted a discontinuance of the practice. Special care should be taken when laying-out so as to avoid the use of drift pins. Boiler makers should be honest and fair to themselves and not allow bad work to go out of the shop. Treat the government inspectors fairly and aid them in their work, for the locomotive boiler inspection law is a great thing. Superheaters add to the life of the boilers and should be used on all locomotives. The more extensive use of welding in boiler work is to be commended.

Frank McNamany, assistant chief boiler inspector, urged the men to aid the government inspectors so as to get the best possible results. The law represents the best practice and is entirely practical.

OXY-ACETYLENE AND ELECTRIC WELDING FOR BOILER REPAIRS.

A. N. Lucas (C. M. & St. P.), chairman of this committee, reported the successful use of both these welding processes in many railroad shops. One of the greatest savings made with the oxy-acetylene process is the cutting out of old or damaged parts. Both processes are used for welding cracked sheets, patches, pitted shells and tubes, etc. Difficulty has been experienced in welding vertical cracks, but this has been overcome by making the patch oval instead of rectangular. Some railroads are cutting their superheater unit pipes and welding them with the oxy-acetylene process. The chief objection to the electric welding process is that no cutting can be done with it, and although it does very good welding it is not as fast as the oxy-acetylene.

Discussion.—Eight electric welding machines are in use on the Erie, and about 60 per cent. of the work done by them is on boilers. It is necessary to preheat the sheets, and steam jets are used for that purpose. The weld should be one-eighth inch thicker than the sheet. Patches are put on the flue sheets at all points and flues are also welded in.

On the Rock Island difficulty is experienced in making welds on flanges and in welding between flues and rivets in the tube sheet flange. Vertical welding is good for only two or three months. Apparatus for both oxy-acetylene and electric welding should be in each shop. Keep the parts to be welded clean and hammer the metal while hot. Eight tubes are welded per hour with electric welding on the Erie. Electric welding does not interfere with other work being done on the locomotive.

BEST DESIGN OF GRATE.

C. J. Murray (So. Pac.) strongly recommended the rocking finger grate for bituminous coal-burning engines. On the Chicago & North Western a close meshed grate, similar to what is used on the hard coal burning engines on the Delaware, Lackawanna & Western, is used on locomotives burning lignite with good success. On oil burning engines there are no grates, but the ash pan, or brick pan as it is called, must be absolutely airtight.

F. D. Timms (C. H. & D.) also recommended rocking finger grates, the fingers to be 6 in. in length and the dump grates at the rear of the firebox. A good steady fire can be maintained on these grates, and when dumping the fingers will crush the clinkers, and at the same time force them into the ash pan.

EFFECT OF CHEMICALLY TREATED WATER ON BOILERS.

The committee, of which A. E. Shaule (D. M. & N.) was chairman, sent out questions to the members from which it was determined that good results had been obtained from the use

of soda ash and caustic soda. There is some difference of opinion as to benefits derived from treated water as a preventive of corrosion. One member reported the use of a polarized metallic preparation, applied direct to the boilers in bars distributed over crown sheet and tubes before closing the boiler and after each washout. This produces an effect more mechanical than chemical; it has an affinity for the material the boiler is made of and forms an amalgam over the boiler plates and tubes which prevents scale forming, also in the case of dirty or scaly boiler the fissures in the scale render it susceptible to removal because the material gets access to the plates and tubes through them, resulting in the scale becoming rapidly loosened and removed, falling to the mud ring or to the bottom of the boiler under the tubes, where it is blown or washed out. Local conditions govern the application of the treatment.

Investigation shows that increased mileage between washouts is obtained by using treated feed water.

Reports indicate that the life of the flues and fireboxes has been lengthened from 150 to 500 per cent. by using treated water. There is also a substantial decrease in cost of maintenance and running repairs.

The use of soda ash will cause trouble to injectors, discharge pipes and check valves. It will also require a larger amount of cylinder lubrication, but such expense is offset by the reduced cost of boiler maintenance.

The cost of treating water is 4 cents per 1,000 gals. on the Santa Fe; and 2 to 5 cents, according to conditions, on the Canadian Pacific. The polarized treatment costs about 3 cents per 1,000 gals.

OTHER BUSINESS.

J. F. De Voy, assistant superintendent motive power, Chicago, Milwaukee & St. Paul, made an address at the closing session on Thursday morning, and the election of officers was held. The report of this session was not received in time for publication in this issue, but will be noticed next week.

FUEL FAMINE IN RUSSIA.—There has been great scarcity of fuel in Russia, and this has seriously interfered with the development of the industries of the country, which are increasing faster than the production and supply of fuel. In consequence, the government proposed to permit the importation to Russia, without duty, of coal from abroad, chiefly for the needs of the railroads.

BAGGAGE RATES IN GERMANY.—No special provision is made in the regulations of the German railways relative to the cost of shipment of samples accompanying commercial travelers, baggage of this class receiving the same consideration as that enjoyed by the traveling public generally. There is no exemption of any character for baggage shipped over the German railway system other than an allowance of 55 lbs., which the traveler is allowed to carry with him in his compartment. Baggage checked to destination is subject to the payment of a rate which varies according to the zone and weight. There are 14 zones, the first having a distance of 15.5 miles and succeeding zones increasing by 31 miles each, up to 497 miles, beyond which distance there is a flat rate which varies only with the weight of the baggage.

FRENCH TRANS-AFRICAN RAILROAD.—The French project for a trans-African railroad from Algiers to Cape Town, using the Belgian-English line from Stanleyville to Cape Town, took rather definite form last year by the incorporation of L'Union Française pour la Réalisation des Chemins de Fer Trans-African. In January, 1912, an expedition to make a preliminary survey from Colomb-Béchar, the present southern terminus of the Algerian railroad, to Lake Tchad, started out from the former point. The engineer who arrived at Lake Tchad in September is said to believe that the crossing of the Sahara desert presents no unsurmountable difficulties. From Lake Tchad the line will presumably follow the divide between the Shari and Nile basins and will enter the Belgian Congo at Semio on the Bomu river, from there going to Stanleyville.—*Mining and Scientific Press.*

General News.

Natural gas has been found near Medicine Hat on the Canadian Pacific, the first well throwing out about 2,000,000 ft. a day.

The New York, New Haven & Hartford now has 402 former employees on its pension roll, and the monthly payments amount to \$158,941.

An anti-pass bill, amended to permit members of the legislature, their families and one clerk or secretary to receive free railway transportation, has been reported favorably by a committee of the Illinois house.

The large shops of the New York, New Haven & Hartford at Readville, Mass., are now running eight hours a day, five days a week; a reduction in the time of most of the men of fourteen hours a week.

The Nebraska state board of equalization has fixed the valuation of the Union Pacific property in the state at \$81,192,530, an increase of \$3,060,368 over that of last year. The main line valuation was increased \$5,000 per mile.

The train accident near Sewell, W. Va., May 20, noticed in our last issue, did not occur on the Chesapeake & Ohio, as reported in the press despatches, but was on a narrow gage line of the Beury Coal & Coke Company.

The Brotherhood of Railway Trainmen, in convention at San Francisco, has adopted resolutions contemplating an effort to obtain additional safety legislation, including a requirement for couplers operated from both sides of a car, and amendments to the hours of service law.

The new office building of the Canadian Pacific Railway, on the corner of King and Yonge streets, Toronto, will be opened next month. This building is 16 stories high and is spoken of as the highest office building in the British Empire. The building is fireproof, 82 ft. x 90 ft.

The Baltimore & Ohio announces that after June 1 its employees will be paid semi-monthly. Laws requiring employees to be paid twice a month have lately been enacted in Pennsylvania and in Indiana; and the company has decided to extend the same practice to other states.

Reports that the Pennsylvania Railroad intends to use a wireless telegraph between Philadelphia and Pittsburgh have again been published. There seems to be no foundation for the statement that the road will establish such a system; but it has a wireless apparatus at Philadelphia and communications have been sent by it to Harrisburg.

A bill before the legislature of Connecticut makes compulsory one day of rest in seven for train despatchers, telegraph operators, towermen and ticket sellers; and representatives of the Order of Railroad Telegraphers have presented to members of the legislature a memorial giving a list of stations in the state at which men, 648 in all, have to work seven days in a week.

Congressman Neeley, of Kansas, has introduced in the House a resolution directing the attorney general to proceed against the Missouri Pacific to recover \$3,362,346 due on subsidy bonds advanced by the government in aid of the construction of the Central Branch of the Missouri Pacific. Mr. Neeley has also made a formal request, direct to the attorney general, that action be taken.

Railway mail clerks, said to number 8,000, have sent to the postmaster general a petition asking that white mail clerks be not required to work in the same cars with negro clerks. It is declared that in some instances whites are subject to the authority of negro superiors. A special protest was made, because on long runs members of the two races frequently have to share the same sleeping quarters.

The Missouri, Kansas & Texas has appointed a valuation committee, with S. B. Fisher, chief engineer of construction, as its chairman. It is announced that the work of the committee will be to ascertain and report in detail as to all property owned or used by the railway, the original cost to date, the cost of reproduction new, the cost of reproduction less depreciation, and analysis of the reasons for their differences.

New rules of the pension department of the Frisco Lines have been issued which provide that after July 1, men inexperienced in railway work who are over 35 years of age, and experienced men over 45 years of age will not be employed, except that provision is made for temporary service, irrespective of age, at the discretion of the president, and the age limit will not be enforced in the case of services requiring professional qualifications.

Telegraphers of the Erie Railroad continue to give out statements to the effect that a strike is impending. After hearing the representatives of the operators a month or two ago, the company made an increase in pay, but the brotherhood leaders now say that the new rates are unsatisfactory; and they declare that a strike vote has been taken, and that it shows that 97 per cent. of the operators have voted to sustain their leaders in a strike if such action shall be found desirable.

A press despatch from Martinsburg, W. Va., May 26, reports that nine workmen were killed and four injured by being struck by an eastbound passenger train of the Baltimore & Ohio at Doe Gully, W. Va., on that day. The victims were workmen for contractors engaged on the Magnolia improvement, and they were running from a blast. In getting away from the danger of the blast, and at the same time avoiding a westbound freight train, they ran in the path of an eastbound passenger.

The Canadian minister of railways announced at Ottawa this week that a resolution will be introduced in the House of Commons providing for a great railway subsidy programme, the principal feature of which is a cash grant of \$15,640,000 to the Canadian Northern. This will be divided into three parts, one of \$6,400 a mile to the Canadian Northern Ontario towards the construction of the line from Toronto to Ottawa, not exceeding 250 miles, another of \$12,000 a mile towards construction of the line from Ottawa to Port Arthur, not exceeding 910 miles, and another subsidy of \$12,000 a mile towards construction of the road from Edmonton, Alberta, to the British Columbia boundary in the Yellowhead Pass, not exceeding 240 miles.

With the summer time table, going into effect this week, the Pennsylvania Railroad announces four new through passenger trains between New York and western points. Westbound these trains leave New York as follows: Pittsburgh day express 9:25 a. m., Commercial express 10:04 a. m., Panhandle limited 12:04 p. m., Chicago express 6:30 p. m. The last mentioned is a section of the St. Louis 24-hour train. The names of through trains are changed as follows: The Chicago Special will be known as the Metropolitan express; the Pennsylvania limited (heretofore running to Chicago, Cincinnati and St. Louis) will only go to Chicago; the Keystone express will be a new name for the Chicago and St. Louis express, starting at 2:04 p. m., and the second section of this train will be called the Panama-Pacific express; the Chicago limited will be known as the Manhattan limited.

The Minnesota Federation of Commercial Clubs at its seventh annual convention, at St. Paul, Minn., May 15, adopted a resolution: "That it is the conviction of this federation that more railroad construction, rather than more railroad legislation, is the great need of this state at the present time; that the legislature should not interfere with the freedom of action and initiative on the part of the carriers, and the laws tending to increase the cost of railroad service, without affording a compensating revenue, be condemned, and that this federation believes there should be at this time a sincere, state-wide effort for the encouragement of railroad extension, with special reference to the construction of lines that will permit the settlement of unoccupied areas, and the building up of a sentiment that will abate anti-railroad prejudice and create between the railroads and the business interests of this state, a pleasant working relation and a fellowship backed by fairness on both sides."

The committee of railroad presidents which has been formed to deal with the subject of valuation of property, under the recent federal law, conferred with the Interstate Commerce Commission in Washington on Tuesday of this week. A statement given out by the commission following the conference says that there was a general exchange of tentative views, but no determination of important points. "A cordial spirit of co-operation was manifested by the railroads," giving promise of the avoidance of many

controversies that otherwise would arise, and promising also economy in the work and avoidance of needless duplication. The following railroad officers participated in the conference: Presidents Rea, of the Pennsylvania; Brown, of the New York Central; Willard, of the Baltimore & Ohio; Loree, of the Delaware & Hudson; Underwood, of the Erie; Baer, of the Reading; Finley, of the Southern; Emerson, of the Atlantic Coast Line; Harahan, of the Seaboard Air Line; Johnson, of the Norfolk & Western; Chairman Kruttschnitt, of the Southern Pacific; President Winchell, of the St. Louis & San Francisco; Vice-President Storey, of the Santa Fe; Presidents Bush, of the Missouri Pacific; Mudge, of the Rock Island, and Gardner, of the Northwestern; Vice-President Holden, of the Burlington, and Chairman Trumbull, of the Chesapeake & Ohio.

Automobile Record.

At the "bowl" course in Brooklands, England, May 27, W. G. Scott and L. G. Hornsted ran an automobile 914 miles, 1,920 ft., in 12 hours; or at the rate of 76.20 miles an hour, breaking all records for periods of seven hours and over.

British Railway Accidents in 1912.

The accident report of the British Board of Trade shows that in the calendar year 1912, the casualties due to train accidents amounted to 867, namely, 20 passengers and 6 employees killed, and 683 passengers, 154 employees and 4 other persons injured. The number of passengers killed is 6 larger than in the preceding year. Accidents of other kinds bring the total number of persons killed, in connection with the movement of trains, up to 1,011, and of injured to 8,700. Adding casualties in which the movement of cars or engines were not concerned, we have a total of 1,118 persons killed and 32,620 injured.

Banker Favors Rate Increase.

John J. Mitchell, president of the Illinois Trust & Savings Bank, Chicago, is quoted in a newspaper interview on the railway situation as follows:

"I fail to see, however, how we can have any of the old-time prosperity until the railroads are better treated than they have been and get what is their due. For years all their costs have been forced up and their revenues have been forced down. They are the largest employers of labor in the country and the treatment accorded them has not been fair. But I think there are better times in store for them."

"There is less opposition now to the 5 per cent. advance in freight rates which the eastern roads are asking than there was. If it is granted it will be a great help. Another would be a decision favoring the railroads in the Minnesota rate case. That and the increase in freight rates would go a long way in helping to re-establish the credit of the railroads and would enable them to secure the funds required for the important work they have on hand."

Railway Committees Confer with Shippers on Rate Advance.

The eastern railways that are negotiating with the Interstate Commerce Commission for 5 per cent. advance in freight rates have appointed a number of committees of traffic officers to confer with the shippers in many of the most important business centers affected, in the endeavor to secure their co-operation. A committee composed of George F. Randolph, vice-president of the Baltimore & Ohio; George D. Dixon, vice-president of the Pennsylvania, and J. M. Fitzgerald, president of the Western Maryland, conferred with the committee of the Merchants' and Manufacturers' Association of Baltimore for this purpose, on May 16, and another committee composed of W. C. Maxwell, general traffic manager of the Wabash; William Hodgdon, freight traffic manager of the Pennsylvania Lines; George H. Ingalls, freight traffic manager of the New York Central lines west; W. B. Biddle, vice-president of the St. Louis & San Francisco; B. C. Stevenson, vice-president, Toledo, St. Louis & Western, and C. L. Thomas, freight traffic manager of the Baltimore & Ohio Southwestern, held a conference with the transportation committee of the Business Men's League of St. Louis on May 23. Similar conferences were held on May 20 with representatives of the Illinois Manufacturers' Association at Chicago and with representatives of the shippers' organizations at Indianapolis on May 20. A committee will visit Boston.

Master Boiler Makers' Association.

Among the exhibitors at the convention of the Master Boiler Makers' Association, held at the Hotel Sherman, Chicago, May 26-29, were the following:

American Arch Company, New York.—Displaying Security brick arch and Gaines locomotive furnace. Represented by Le Grand Parish, G. M. Bean, J. T. Anthony, Jno. P. Neff, Chas. Coons, W. L. Allison, F. G. Boomer, M. K. Tate, Geo. Wagstaff, J. M. Horine, C. E. Miller, C. F. Pfeiffer and G. C. Denney.

American Flexible Bolt Company, Pittsburgh, Pa.—Displaying boiler staybolts. Represented by C. A. Seley.

Burden Iron Company, Troy, N. Y.—Displaying engine and staybolt iron and Burden rivets. Represented by G. H. Pearsall, Fred Gardner, J. G. Kirby, F. L. Nicholson, M. C. Beymer, E. S. Richardson and A. W. Whiteford.

Carbon Steel Company, Pittsburgh, Pa.—Displaying firebox and boiler steels, nickel and nickel crown alloy steels. Represented by E. K. Harris, H. W. Tennell and J. P. Williams.

A. M. Castle Co., Chicago.—Displaying Luken pressed steel cover plates. Represented by L. M. Henoch, W. B. Simpson, C. M. Chamberlain, A. C. Castle and George Boyce.

Champion Rivet Company, Cleveland, Ohio.—Displaying Victor rivet and M. C. B. knuckle pins. Represented by D. J. Champion and W. H. S. Bateman.

Chicago Pneumatic Tool Company, Chicago.—Displaying new type electric drill for heavy flue rollers, pneumatic and electric tools. Represented by C. E. Walker, Jno. Campbell, Michael O'Connor, T. G. Smallwood, J. W. McCabe, Edward Aplin, Pete Flavin, J. L. Canby and C. Priddy.

Cleveland Pneumatic Tool Company, Cleveland, Ohio.—Displaying Bowes hose couplers, Cleveland ball bearing air drills. Represented by H. S. Covey and C. J. Albert.

Cleveland Steel Tool Company, Cleveland, Ohio.—Displaying punches, dies, rivet sets and chisel blanks. Represented by R. J. Vernning, V. D. Gilmore and W. S. Barnes.

Dearborn Chemical Company, Chicago. Represented by C. B. Hennessey, A. W. Cruch, J. F. Franey, J. D. Purcell and J. H. Cooper.

J. Faessler Manufacturing Company, Moberly, Mo.—Displaying boiler flue expanders, flue cutters, etc. Represented by J. W. Faessler, C. F. Palmer, G. R. Maupin and F. E. Palmer.

Flannery Bolt Company, Pittsburgh, Pa.—Displaying Tate flexible staybolt. Represented by J. R. Flannery, B. E. D. Stafford, Tom R. Davis, Wm. Wilson, Thos. Leahy and Geo. Howard.

Globe Seamless Steel Tubes Company, Chicago.—Displaying Globe seamless steel tubes. Represented by Harrison L. Davies and Geo. Thust.

Hilles & Jones, Wilmington, Del.—Displaying catalogs and circulars of their output. Represented by Wm. H. Connell, Jr.

Inland Steel Company, Chicago.—Displaying open-hearth rivets. Represented by Herbert L. Hart.

Independent Pneumatic Tool Company, Chicago.—Displaying new turbine drill and other pneumatic tools. Represented by Jno. D. Hinley, Robt. T. Scott, Jno. P. Bourke, Harry Tinney, Geo. Wilson and Fred Passins.

Ingersoll-Rand Co., New York.—Displaying Little David riveting hammers and drills. Represented by Chas. Dougherty, J. P. Gillies, L. J. Davis and J. D. Rathburn.

Jacobs-Shupert U. S. Firebox Company, New York.—Displaying Jacobs-Shupert sectional firebox. Represented by C. B. Moore, G. H. Pearsall, M. C. Beymer, A. W. Whiteford, W. L. Bean, J. C. Reid, Fred Gardner, J. L. Nicholson, F. W. Peterson and J. G. Kirby.

Liberty Manufacturing Company, Pittsburgh, Pa.—Displaying Cyclone tube cleaners. Represented by Charles C. Hughes and S. A. Bockins.

Locomotive Superheater Company, New York.—Displaying section of superheater flue, set in back and front, showing prossers and rollers for superheater flues. Represented by Gilbert E. Ryder, C. A. Schaff and Jno. Bell.

Lovejoy Tool Works, Chicago.—Displaying boiler tube expanders, beading tools and boiler shop small tools. Represented by W. H. Danzell and T. H. Lovejoy.

Mudge & Co., Chicago.—Displaying spark arrester. Represented by S. S. Lawson and J. J. Winchell.

Christopher Murphy & Co., Chicago.—Displaying Carter's staybolt iron and O'Neill rapid tube cutter. Represented by Christopher Murphy.

Oxweld Railroad Service Company, Chicago.—Displaying oxy-acetylene welding and cutting apparatus. Represented by C. B. Moore, G. H. Pearsall, M. C. Beymer, W. L. Bean, A. W. Whiteford, F. W. Peterson, J. C. Reid, Fred Gardner, J. L. Nicholson and J. G. Kirby.

Parkersburg Iron Company, Parkersburg, Pa.—Displaying Parkersburg charcoal iron boiler flues, charcoal iron superheater flues and swaging and swelling of same. Represented by Geo. Thomas, C. L. Hampton, H. C. Hunter, J. H. Smyth, W. H. S. Bateman and L. P. Mercer.

Pittsburgh Steel Products Company, Pittsburgh, Pa.—Displaying cold drawn seamless steel boiler tubes. Represented by Chas. R. Phillips and Cyrus R. King.

Joseph T. Ryerson & Son, Chicago.—Displaying model punch in operation, drills, tube expanders, etc. Represented by J. T. Hender, J. T. Corbett, A. M. Mueller, J. P. Moses, C. E. Pynchon, Geo. Merrill and L. H. Bryan.

Siemond & Wenzel Electric Welding Company, New York.—Displaying electric welders. Represented by L. S. Smith and G. S. Stuart.

Scully Steel & Iron Company, Chicago.—Displaying everlasting blow-off valve used by 36 leading railroads, guaranteed drop tight for two years; 200,000 working. Represented by Geo. Mason, Jr., Geo. A. Cameron, Andrew Verschuur and W. I. Jones.

The Pearsall Company, New York.—Displaying high speed drills, sectional roller expanders, reamers, etc. Represented by G. H. Pearsall, Fred Gardner, J. G. Kirby, F. L. Nicholson, M. C. Beymer and E. S. Richardson.

Vulcan Engineering Sales Company, Chicago.—Displaying Hanna riveter. Represented by Jas. T. Lee, J. T. Georgeson and W. H. Huelster.

United States Graphite Company, Saginaw, Mich.—Displaying Mexican boiler graphite. Represented by H. C. Woodruff, J. G. Drought and J. W. Eviston.

Worth Bros. & Co., Coatesville, Pa.—Displaying steel plates and iron tubes. Represented by B. A. Clements and C. A. Keenan.

M. M. and M. C. B. Enrollment Committee.

The work of the Enrollment Committee of the M. M. and M. C. B. conventions to be held at Atlantic City, N. J., June 11-18, has been arranged and will differ from the practice in recent years. Two new rules have been adopted as follows:

Badges for members of the M. M. or M. C. B. associations or special guest badges will not be given to any but the rightful owners. No member of the Railway Supply Manufacturers' Association will be permitted to take one for delivery except upon the owner's written order and the receiver must sign for said badge.

No badges will be issued to members of the M. C. B. association except on the payment of a fee of one dollar (\$1.00); M. M. and special guest badges will be issued to those entitled to them free of all charge until noon, Saturday, June 14, at which time M. M. badges will be withdrawn and a charge of one dollar (\$1.00) made for all special guest badges, except that a member of the M. M. association taking out a special guest badge and paying the fee of one dollar will be given his M. M. badge gratis; likewise members of the M. M. association who are also members of the M. C. B. association can get their M. M. badge by paying for the M. C. B. badge.

The work of the committee has been so arranged that enrollment will be possible at almost any time of day throughout the conventions. The committee has been divided into three shifts, each of which will report for duty according to a regular schedule so that although the committee will be represented during a much greater part of the time than has previously been the case the individual members will not have longer hours than before. The system of enrollment will be the same as that used in 1912 and the members of the Railway Supply Manufacturers' Association will be enrolled as heretofore.

The committee is made up as follows: F. N. Bard, Barco Brass & Joint Co., Chicago; F. E. Beal, Magnus Metal Co., Atlanta, Ga.; C. W. Beaver, Yale & Towne Manufacturing Co., New York; Harold A. Brown, *Pocket List of Railroad Officials*, New York; E. Bjerregaard, *Official Guide*, New York; Charles H. Gayetty, Quaker City Rubber Co., Philadelphia, Pa.; R. F. Moon, Westinghouse Electric & Manufacturing Co., Philadelphia, Pa.; H. G. Newman, The H. W. Johns-Manville Co., New York; E. T. Sawyer, Commercial Acetylene Railway Light & Signal Co., New York; Benjamin A. Smith, W. H. Coe Manufacturing Co., Providence, R. I.; F. H. Smith, Gold Car Heating & Lighting Co., New York; J. A. Stevens, F. W. Devoe & C. T. Raynolds Co., New York.

International Railway Fuel Association.

Among the exhibitors at the convention of the International Railway Fuel Association held in Chicago, May 21-24, were the following:

Dickerson Manufacturing & Supply Company, Clinton, Ill.—Bull's eye water gages. Represented by C. Dickerson.

Goodman Manufacturing Company, Chicago.—Photographs of electric coal cutting machines and electric mining locomotives. Represented by F. S. Mott and H. H. Small.

Hawkes Boiler Company, Chicago.—Model of Hawkes boilers. Represented by C. W. Hawkes and H. E. Wallis.

Link Belt Company, Chicago.—Photographs of coal tipple, coal crushers, chain retarding conveyors, coaling stations and locomotive cranes. Represented by J. C. Nelleger.

Locomotive Superheater Company, New York.—Photographs of Schmidt superheaters. Represented by G. E. Ryder, F. A. Schaff, W. G. Tawse, R. M. Osterman and W. Boughton.

Manistee Iron Works, Chicago.—Model of Continental chain grate stoker for stationary boilers and Rees Roturbo centrifugal pump. Represented by Henry Vick.

Mudge & Co., Chicago.—Mudge-Slater spark arresters. Represented by B. W. Mudge, S. S. Lawson and J. I. Winchell.

National Graphite Lubricator Company, Scranton, Pa.—Model of graphite lubricator and photographs showing installations. Represented by L. S. Waters.

Ogle Construction Company, Chicago.—Model of automatic all-steel locomotive coaling station. Represented by R. A. Ogle and C. F. Bledsoe.

Parsons Engineering Company, Wilmington, Del.—Photographs of Parsons system of combustion in locomotive fireboxes showing elimination of smoke. Represented by W. H. Savery.

Roberts & Schaefer Co., Chicago.—Photographs of Holmen coaling stations in concrete, steel and wood. Represented by C. P. Ross, E. E. Barrett, Frank Schroeder, James Shannon and W. R. Roberts.

G. L. Simonds & Company, Chicago.—Dean arch tube cleaner, Vulcan soot cleaner for water and fire tube boilers, Eclipse smoke indicators, Hayes gas analyzing instruments and draft gages. Represented by F. A. Moreland.

T. W. Snow Construction Company, Chicago.—Photographs of coaling stations. Represented by T. W. Snow, R. A. Blake and M. D. Miller.

U. S. Graphite Company, Saginaw, Mich.—Mexican boiler graphite. Represented by H. C. Woodruff, J. G. Drought and J. W. Eviston.
George D. Whitecomb Co., Rochelle, Ill.—Photographs of gasoline motors for mine haulage. Represented by J. H. Coley.

Association of Railway Telegraph Superintendents.

Among the exhibitors at the convention of the Association of Railway Telegraph Superintendents, held at the Hotel Statler, St. Louis, May 20-23, were the following:

Automatic Electric Company, Chicago.—Private branch exchange telephone systems, standard Keith line switch type board, individual connection type board, telephone train despatching selector system, Holtzer-Cabot motor-generator sets, and Raven Brand supplies. Represented by J. H. Finley.
Bunnell & Co., Inc., New York.—Goldbug vibrating transmitters and C. Q. A. relays. Represented by J. J. Ghegan.
Central Electric Company, Chicago.—Indirect lighting system, and demonstration of Alexalite system of illumination, Okonite wire and tapes, Columbia lamps, Maxolite weather proof reflectors, etc. Represented by J. Lorenz and G. M. Cox.
Thomas A. Edison, Inc., Orange, N. J.—Primary battery sets. Represented by E. E. Hudson, F. J. Lepreau and P. A. Grarriety.
Electric Time Recorder Company, Chicago.—Mastron time system, embracing master mechanisms, secondary clocks, time recorders, etc. Represented by Andrew Nilson and F. W. Straub.
Gottschalk Waterproof Sanitary Transmitter Company, New York.—Waterproof transmitters. Represented by W. J. Lowrie, Jr.
Hall Switch & Signal Company, New York.—Telephone arms and Gill and Sandwich selectors. Represented by W. E. Harkness, J. L. Moore and W. L. Cook.
National Electric Specialty Company, Chicago.—Vacuum lightning arresters.
National India Rubber Company, Bristol, R. I.—Represented by A. P. Eckert.
Railway Electric Manufacturing Company, Chicago.—Alternating current selectors. Represented by H. O. Rugh.
Remington Typewriter Company, New York.—Typewriter with a Wahl adding and subtracting machine. Represented by M. K. Deale.
Western Electric Company, New York.—Selector apparatus, wireless telegraph set for emergency purposes, vacuum protectors, telegraph and telephone jack boxes, and two types of Thompson-Levering Wheatstone bridges. Represented by G. K. Heyer, R. F. Spamer, R. N. Hill, J. A. Kick, E. V. Adams and G. E. Cullinan.

Railway Signal Association.

The next meeting of the Railway Signal Association will be held at Hotel Astor, Broadway and Forty-fourth street, New York, on June 11 and 12. Reports will be presented by Committees 2, 3, 4, 5, 6, 8 and 10. Committee No. 2 will submit proposed standard drawings of switch layouts, with different arrangements of facing point locks and detector bars. Committee No. 3, Power Interlocking, will submit specifications for the installation of vitrified clay conduit, and will propose reconsideration of action taken in 1911 on circuit plans for electric interlocking. Committee No. 4 will submit specifications for d. c. interlocking relays and for vibrating highway crossing alarm bells; and will propose changes in the existing specifications for d. c. relays. Committee No. 5 will propose additions to and revisions of the information now on record concerning the manual block system, including three drawings. Committee No. 6 will submit drawings of six new standards; crank stands, pipe carrier side, details and assembly of pipe carriers; assembly of bolt lock, and position of detector bar and location. Committee No. 8 will propose additions to the existing specifications for electric railway signaling; including impedance bonds and single phase track transformer; also for switch boards.

Committee No. 10 will submit specifications for lead type stationary storage battery.

J. E. Saunders will present a paper on selection of motor generators for use as frequency converters, 60 to 25 cycles, and another on 25 cycle versus 60 cycle a. c. power for railway signaling.

Signal Appliance Association.

There will be a meeting of the Signal Appliance Association at the Hotel Astor, New York, on June 11, in connection with the meeting of the Railway Signal Association which will be held at the same place, June 11-12.

The Signal Appliance Association has extended to the members of the Railway Signal Association an invitation to participate in an excursion on the afternoon of June 11 around the water front of New York, both North and East rivers, thence down the coast to Rockaway Point and landing at Coney Island for a shore dinner. The boat, which has been specially chartered for the occasion, will not leave Coney Island for New York until late in the evening.

Western Railway Club.

Officers of the Western Railway Club have been elected as follows: President, Henry Larue, formerly of the Rock Island Lines; first vice-president, W. B. Hall, Union Railway Equipment Co., and second vice-president, E. W. Pratt. Three new directors were also elected as follows: C. J. Olmstead, Westinghouse Air Brake Co.; J. H. Tinker, superintendent motive power, Chicago & Eastern Illinois, and H. H. Harvey, general car forwarder, Chicago, Burlington & Quincy.

American Society for Testing Materials.

The sixteenth annual convention of the American Society for Testing Materials will be held at the Hotel Traymore, Atlantic City, N. J., June 24-28.

Freight Rate Increases in England.

The railway companies of Great Britain have given notice that the general increase in freight rates which they have been authorized by the government to make, in consequence of the increase in wages of employees which had to be made two years ago, will be put in force July 1 next. Although the agreement with the government was made in August, 1911, the change in the law which gives the necessary authority was only completed a few weeks ago. It is said that, even after the contemplated increase, the rates will still be within the maximum tariffs prescribed by Parliament prior to 1894.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass. Convention, May 19, 1914, St. Louis.
AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York. Annual meeting, October 14-15, Philadelphia, Pa.
AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill. Annual meeting, June 17-20, Buffalo, N. Y.
AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Friday of March and September.
AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
AMERICAN ELECTRIC RAILWAY MANUFACTURERS' Assoc.—George Keegan, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.
AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next meeting, November 19, 1913, Chicago.
AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Convention, October 21-24, 1913, Montreal.
AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago.
AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Convention, June 11-13, Atlantic City, N. J.
AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga.
AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.; annual, June, 1913.
AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.
AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wenlinger, 11 Broadway, New York; 2d Tuesday of each month, New York.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 20-22, 1914, New Orleans, La.
ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago. Annual meeting, May 28, Atlantic City, N. J.
ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago. Next meeting, May, 1913, Baltimore, Md.
ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Semi-annual meeting, June 16, 1913, Atlantic City, N. J.; annual convention, October 18-24, Chicago.
ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago.
ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Summer meeting, June 25-26, Charlevoix, Mich.
ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y. Annual meeting, October 8, Philadelphia, Pa.
BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—H. A. Neally, Joseph Dixon Crucible Co., Jersey City, N. J. Meeting with American Railway Bridge and Building Association.
CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.
CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursday, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, Oliver building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va. Next convention, June 18, Bluff Point, N. Y.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July 15-18, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Annual meeting, August 18, Richmond, Va.

MAINTENANCE OF WAY & MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—W. G. Wilson, Lehigh Valley, Easton, Pa.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Convention, June 16-18, Atlantic City, N. J.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Annual meeting, September 9-12, Ottawa, Can.

NATIONAL RAILWAY APPLIANCE ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria; 2d Thursday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noyom, 2 Rector St., New York. Annual dinner, second week in December, 1913, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo. Next meeting, August 12-15, Nashville, Tenn.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. Meetings, Wednesday and Thursday, June 11-12, New York; convention, October 14, Nashville, Tenn.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.

RAILWAY TEL. AND TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Telec. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W. Sterling, Ill. Convention, September 8-12, 1913, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meeting with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago. Annual meeting, June 17, Los Angeles, Cal.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Annual meeting, August, 1913, Chicago.

UTAH SOCIETY OF ENGINEERS.—R. B. Ketchum, University of Utah, Salt Lake City, Utah; 3d Friday of each month, except July and August.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News.

Albert Weil, secretary and treasurer of the Louis Lipp Co., bath tub manufacturer of Cincinnati, has been sentenced by United States Judge Hollister to serve 60 days in prison for violation of the interstate commerce law, in falsely stating the weight of freight shipped.

Train Disaster in the Congo.

A press despatch of May 20 from Boma, Belgian Congo, reports 20 passengers and 3 trainmen killed by the falling of a train into the river from a bridge 150 ft. high. The entire train fell, and no person on it was saved.

Traffic Club of New York.

At the meeting of the Traffic Club of New York, held on May 27, two resolutions were offered by the Public Affairs Committee for adoption by the club. One of the resolutions was opposed to the clause in the Sundry Civil Bill which forbids any part of the appropriation made for the enforcement of the Sherman Anti-Trust Law, to be used in the prosecution of labor or farmers' organizations and the other urged that provision be made for the continuance of the Commerce Court. Both resolutions were unanimously adopted.

Traffic Club of Chicago.

J. F. Barron, general agent of the freight department of the Union Pacific, at Chicago, addressed the Traffic Club of Chicago on May 20, giving an interesting description of methods of handling l. c. l. freight at the local stations of the Illinois Central, of which he was until recently local freight agent. He described a new method, introduced since the strike last year, known as the multiple truck system, by which 5 to 15 trucks are used for each trucker, and instead of waiting for a truck to be loaded or unloaded the trucker takes another truck and handles another load, eliminating much of the empty truck movement and the enforced idleness of the truckers a large part of the time, which prevailed under the former system. Mr. Barron said that it had been demonstrated that this plan reduces the cost of floor movement about one-third, 50 per cent. of whatever saving is made being distributed among the freight handlers in the form of increased pay. He suggested that in the absence of mechanical carriers or moving platforms in the city terminals the efficiency of freight handling could be greatly increased by the establishment of large outer sorting platforms or warehouses where out-bound package freight could be assembled and consolidated, and where the floor movement could be performed by mechanical devices.

The Traffic Club will hold its first outing of the season at the Beverly Country Club on Tuesday, June 3. The program includes golf and tennis tournaments, baseball game, and bridge for the ladies.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 143-A, giving a summary of car surpluses and shortages by groups from February 14, 1912, to May 15, 1913, says:

The total surplus on May 15 was 61,269 cars; on May 1, 53,977 cars; and on May 23, 1912, 123,683 cars. Compared with the preceding period; there is an increase in the total surplus of 7,292 cars, of which 4,949 is in box, 227 in flat, 24 in coal and 2,092 in miscellaneous cars. The increase in box car surplus is in all groups, except 9 (Texas, Louisiana and New Mexico), and 10 (Washington, Oregon, Idaho, California, Nevada and Arizona). The increase in flat car surplus is in all groups, except 3 (Ohio, Indiana, Michigan and Western Pennsylvania), 5 (Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida), and 10 (as above). The increase in coal car surplus is in all groups, except 2 (New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania), 7 (Montana, Wyoming, Nebraska and the Dakotas), and 10 (as above). The increase in

miscellaneous car surplus is in groups 1 (New England Lines), 2, 3 (as above), 4 (the Virginias and Carolinas), 5, 7 (as above), 8 (Kansas, Colorado, Oklahoma, Missouri and Arkansas), 9 (as above), and 11 (Canadian Lines).

The total shortage on May 15 was 10,975 cars; on May 1, 14,178 cars; and on May 23, 1912, 7,482 cars. Compared with the preceding period; there is a decrease in the total shortage of 3,203 cars, of which 3,273 is in box, 826 in miscellaneous, and an increase of 403 in flat and 493 in coal car shortage. The decrease in box car shortage is in all groups, except 10 (as above). The decrease in miscellaneous car shortage is in all groups, except 9 (as above). The increase in flat car shortage is in groups 4, 5, 9, 10 and 11 (as above). The increase in coal car shortage is in groups 2, 4, 5, 9, 10 and 11 (as above).

Compared with the same date of 1912; there is a decrease in the total surplus of 62,414 cars, of which 767 is in flat, 58,801 in coal, 2,847 in miscellaneous, and an increase of 1 in box car sur-

plus. There is an increase in the total shortage of 3,493 cars, of which 963 is in box, 831 in flat, 1,577 in coal and 122 in miscellaneous cars.

The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report, and a diagram shows total bi-weekly surpluses and shortages from 1907 to 1913.

Summary of Revenues and Expenses of Steam Roads in March.

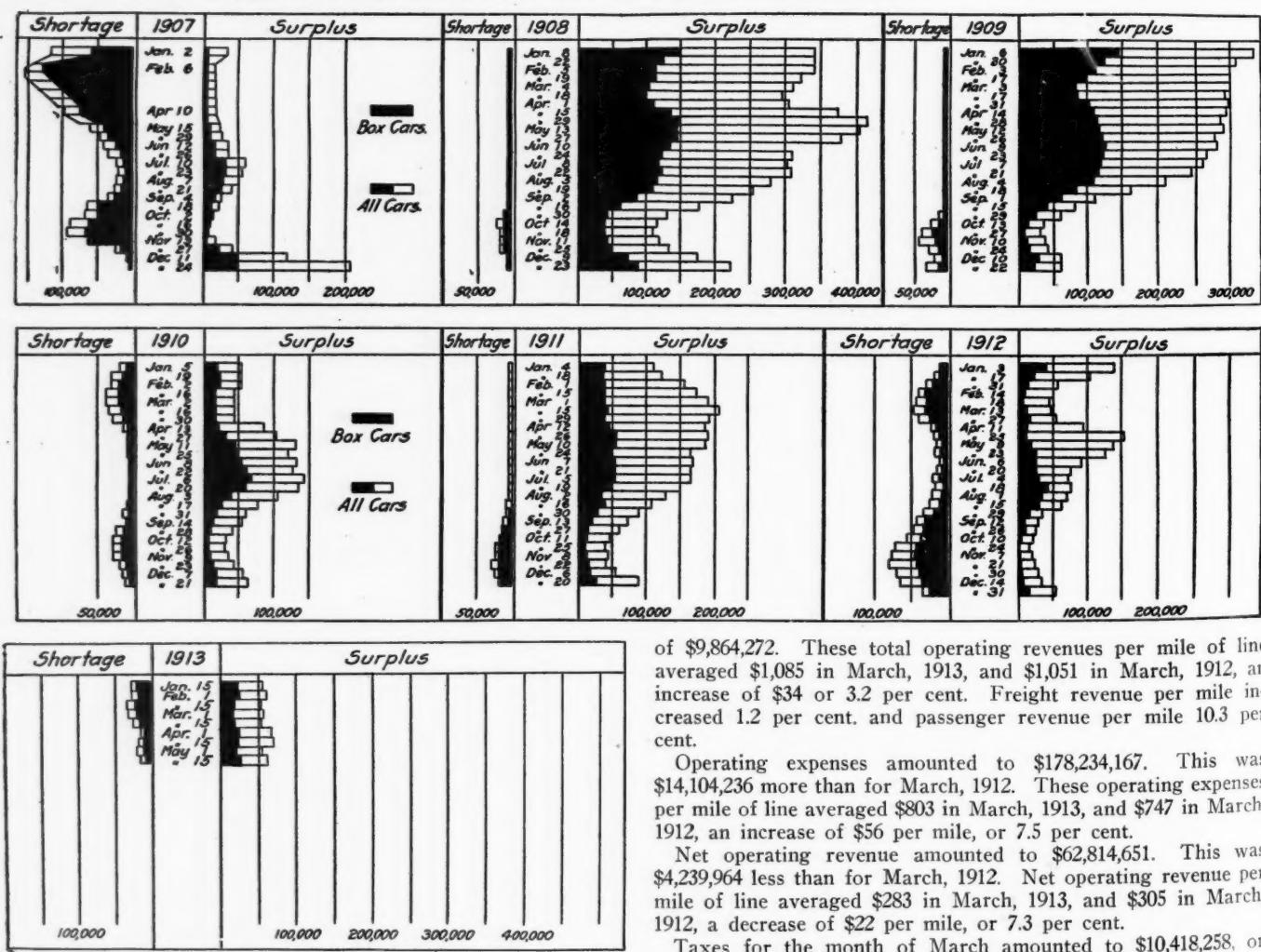
The Bureau of Railway Economics' summary of revenues and expenses and comments thereon for March are as follows:

The railways whose returns are included in this bulletin operate 222,086 miles of line, or about 90 per cent. of the steam railway mileage in the United States. Total operating revenues for the month of March, 1913, amounted to \$241,048,818. Compared with March, 1912, the total operating revenues show an increase

CAR SURPLUSES AND SHORTAGES.

Date.	No. of roads.	Surpluses				Shortages					
		Box.	Flat. and hopper.	Coal, gondola	Other kinds.	Total.	Box.	Flat. and hopper.	Coal, gondola		
Group *1.—May 15, 1913.	7	502	679	76	103	1,360	58	104	0	162	
" 2.—" 15, 1913.	34	486	43	2,640	567	3,736	11	0	1,054	0	1,065
" 3.—" 15, 1913.	32	1,452	146	789	1,536	3,923	417	94	934	43	1,488
" 4.—" 15, 1913.	11	4,344	12	781	1,106	6,243	50	716	1,500	0	2,266
" 5.—" 15, 1913.	29	1,252	0	226	808	2,286	860	711	503	0	2,074
" 6.—" 15, 1913.	33	4,369	182	2,622	3,489	10,662	799	212	10	8	1,029
" 7.—" 15, 1913.	6	373	237	367	640	1,617	0	0	0	0	0
" 8.—" 15, 1913.	19	1,690	246	2,032	3,644	7,612	152	0	75	12	239
" 9.—" 15, 1913.	17	2,003	360	305	1,596	4,264	200	3	6	22	231
" 10.—" 15, 1913.	25	5,162	984	2,254	7,768	16,168	263	138	86	182	669
" 11.—" 15, 1913.	7	1,666	397	175	1,160	3,398	1,071	471	58	152	1,752
Total	220	23,299	3,286	12,267	22,417	61,269	3,881	2,449	4,226	419	10,975

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages, 1907 to 1913.

of \$9,864,272. These total operating revenues per mile of line averaged \$1,085 in March, 1913, and \$1,051 in March, 1912, an increase of \$34 or 3.2 per cent. Freight revenue per mile increased 1.2 per cent. and passenger revenue per mile 10.3 per cent.

Operating expenses amounted to \$178,234,167. This was \$14,104,236 more than for March, 1912. These operating expenses per mile of line averaged \$803 in March, 1913, and \$747 in March, 1912, an increase of \$56 per mile, or 7.5 per cent.

Net operating revenue amounted to \$62,814,651. This was \$4,239,964 less than for March, 1912. Net operating revenue per mile of line averaged \$283 in March, 1913, and \$305 in March, 1912, a decrease of \$22 per mile, or 7.3 per cent.

Taxes for the month of March amounted to \$10,418,258, or \$46.91 per mile, an increase of 7.7 per cent. over March, 1912.

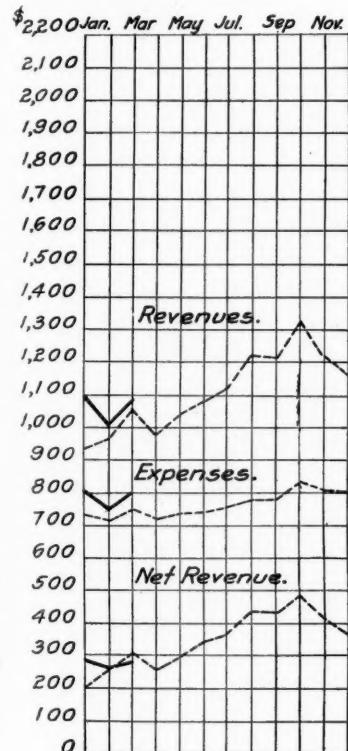
Operating income averaged \$235 per mile of line, and in March, 1912, \$261, thus decreasing \$26, or 9.9 per cent. Operating income for each mile of line for each day in March averaged \$7.57, and for March, 1912, \$8.41.

The operating ratio for March was 73.9 per cent., which is comparable with 74.4 per cent. in February, 1913, and 71.0 per cent. in March, 1912.

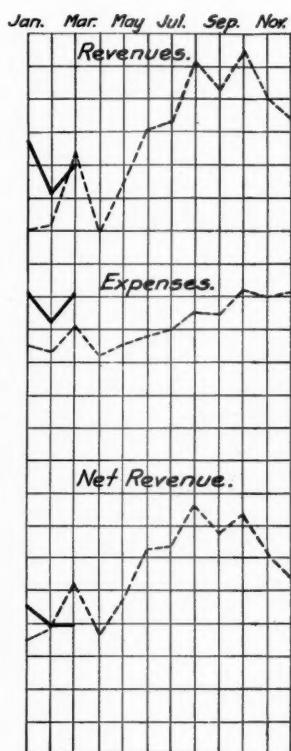
The railways of the eastern district show a decrease in total operating revenues per mile of line as compared with March, 1912, of 1.8 per cent., the railways of the southern district show an increase of 5.8 per cent., and the railways of the western district an increase of 8.5 per cent. Operating expenses per mile increased 7.6 per cent. on the eastern railways, 5.7 per cent. on the southern railways, and 8.6 per cent. on the western railways. For the eastern railways net operating revenue per mile decreased 25.0 per cent., for the southern railways it increased 6.2 per cent., and for the western railways it increased 8.5 per cent. The increase in taxes per mile was 7.8 per cent. in the eastern district, 6.9 per cent. in the southern district, and 8.0 per cent. in the western district. Operating income per mile decreased 31.3 per cent. in the East, while it increased 6.6 per cent. in the South, and increased 9.4 per cent. in the West.

Comparison of the returns for the nine months of the fiscal

Total All Roads.



Eastern Group.



1913 to date. The following table shows the per cent. of operating revenues consumed by each class of expenses:

PER CENT. OF TOTAL OPERATING REVENUES.

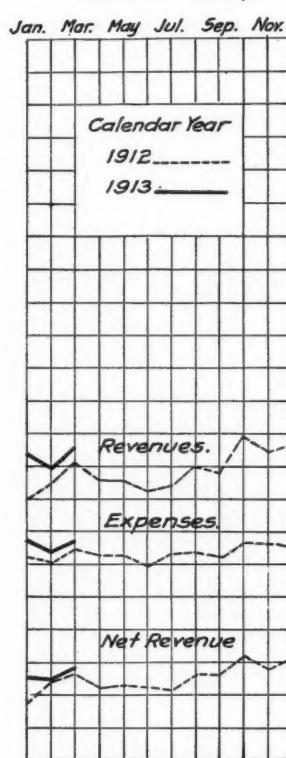
	March,		Fiscal year ended June 30,		Calendar year ended December 31,	
	1913.	1912.	1912.	1911.	1912.	1911.
Maintenance of way and structures.	12.6	10.6	12.7	12.9	12.8	12.7
Maintenance of equipment.....	17.7	16.8	15.8	15.5	16.0	15.7
Traffic expenses	2.2	2.1	2.2	2.2	2.0	2.1
Transportation expenses	38.8	39.0	35.9	35.5	35.5	35.4
General expenses	2.6	2.5	2.5	2.5	2.4	2.5
Total operating expenses.....	73.9	71.0	69.1	68.6	68.7	68.4

INTERSTATE COMMERCE COMMISSION.

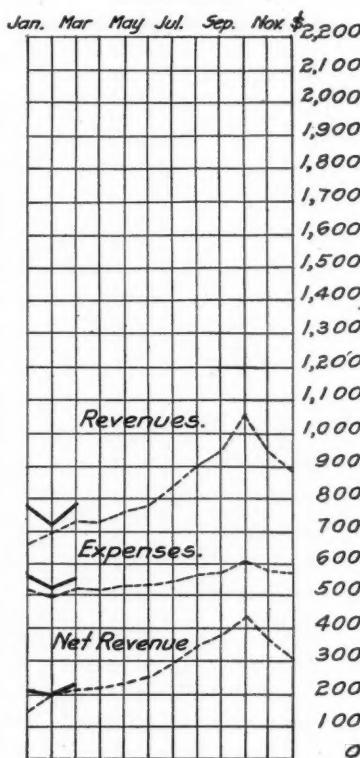
The commission suspended from April 15 until October 15, certain revised pages of the tariff of the Canadian Pacific, which would advance rates on paper from Brownville Junction, Me., to Akron, Ohio.

The commission has suspended until October 14, certain tariffs which contain advances in rates on wheat from Kansas City,

Southern Group.



Western Group.



Monthly Revenues and Expenses Per Mile of Line in 1912 and 1913.

year with those of the corresponding months of the previous fiscal year reveals an increase in total operating revenues per mile of 9.4 per cent., an increase in operating expenses per mile of 8.9 per cent., and an increase in net operating revenue per mile of 10.5 per cent. This net operating revenue per mile of the eastern railways increased 6.5 per cent. as compared with the corresponding period of the previous year, that of the southern railways increased 5.9 per cent., and that of the western railways increased 16.3 per cent.

When the returns for the three months of the calendar year 1913 are compared with those of the corresponding months of 1912, they show an increase in total operating revenues per mile of 8.3 per cent., an increase in operating expenses per mile of 8.2 per cent., and an increase in net operating revenue per mile of 8.6 per cent. This net operating revenue per mile decreased 1.0 per cent. in the eastern district as compared with the corresponding period of the previous year, increased 16.4 per cent. in the southern district, and increased 16.0 per cent. in the western district.

The diagram shows the variations in operating revenues, operating expenses, and net operating revenue per mile for the separate months of the calendar year 1912 and of the calendar year

Mo., and other points to Edwardsville, Ill., Lawrenceville, Ill., and other points.

The commission has suspended from May 2 until November 1 certain tariffs, which proposed to advance class and commodity rates between points in Iowa and Minnesota and points in Pacific coast territory.

The commission has suspended from March 31 until September 30, the items in certain tariffs which would increase rates on flax tow, flax moss and flax fiber in carloads, from St. Paul, Minn., to Chicago, Kansas City, Mo.

The commission has suspended from May 2 until August 30 the item in a supplement to Agent F. A. Leland's tariff, which contains advanced rates on cotton seed and cotton seed products from points in Texas to New Orleans, La.

The commission has suspended from May 10 until September 6 the supplement to the tariff of the Alabama Great Southern which advances rates on logs, c. l., from stations located on the Alabama Great Southern to Chattanooga, Tenn.

The commission has suspended from May 1 until August 29 the schedules contained in certain tariffs, which proposed to

advance rates for the transportation of butter and eggs from Topeka, Kan., to Memphis, Tenn., and other points.

The commission has suspended from March 31 to September 30, certain tariffs which would increase rates on lumber from Memphis and other points to New Orleans and other destinations.

The commission has suspended from May 1 until November 1 the schedules contained in a supplement to the tariff of the Delaware & Hudson, which proposed to eliminate milling-in-transit privileges extended to shipments of corn milled or mixed at Oneonta, N. Y.

The commission has suspended until July 17 the schedules contained in certain tariffs, which proposed to cancel joint through class and commodity rates from and to stations on the Bangor & Aroostook on shipments routed via the Maine Central.

The commission has suspended from May 5 until September 2 the schedules contained in a supplement to Agent W. P. Emerson's tariff, which contain advances in class and commodity rates between New Orleans, La., and other points in the south and points in Illinois.

The commission has suspended from May 1 until November 1 certain schedules in a supplement to Agent C. H. Griffin's tariff, which proposed to advance charges for the refrigeration of carload shipments of fruits, vegetables, etc., between points in Colorado and Utah.

The commission has suspended until October 14, certain tariffs, containing new regulations governing the switching of coal and coke from the lines of certain carriers to certain stations on the Chicago, Milwaukee & St. Paul located within the limits of the Chicago switching district.

The commission has suspended from May 5 until September 2 the operation of the schedules in a supplement to the tariffs of the Southern Pacific, which propose to increase by \$2 per 2,000 lbs. rates on lumber from certain points in California to El Paso, Tex., and other points.

Reparation Awarded.

G. L. Jubitz, assignee, v. Southern Pacific et al. Opinion by the commission:

The commission decided that the rate of \$3.094 per gross ton for the transportation of coke from Wilkeson, Wash., to Salem, Oregon, was unreasonable to the extent that it exceeds \$2.55 per gross ton, and prescribed that rate for the future. (27 I. C. C., 44.)

Complaint Dismissed.

E. I. DuPont DeNemours Powder Co. v. Pennsylvania Railroad et al. Opinion by Commissioner Harlan:

As the shipment involved in this case was delivered to the consignee on June 18, 1907, and as the complaint was not filed until July 15, 1909, the complaint is barred by the period of limitation fixed in the act. (27 I. C. C., 59.)

Milburn Wagon Co. v. Toledo, St. Louis & Western et al. Opinion by the commission:

In this case the complainant alleges that the rating of freight vehicles with springs, in carloads, in the Southern classification is unreasonable. The Southern classification now provides a second class rating with a minimum of 8,000 lbs. for 36 ft. cars and the complainant seeks to have the Southern classification so amended as to provide a fourth class rating with a minimum carload weight of 12,000 lbs. The commission decided that the present rating was not shown to have been unreasonable. (27 I. C. C., 63.)

Break-Bulk Rates on Grain.

In re investigation and suspension of advances in break-bulk rates by carriers for the transportation of grain and grain products from Milwaukee, Manitowoc, and Keweenaw, Wis., to Boston, Mass., New York, N. Y., Philadelphia, Pa., Baltimore, Md., and other points. Opinion by Commissioner Meyer:

The respondents failed to meet the burden of proof which the statute places upon them as to the reasonableness of the proposed advances in local, joint, and proportional break-bulk rates,

domestic and export, on grain and grain products from Milwaukee, Manitowoc, and Keweenaw, Wis., to points in trunk line territory east of Niagara frontier, and the commission ordered them to cancel the suspended tariffs. (27 I. C. C., 78.)

Live Stock Rates Reduced.

Rock Spring Distilling Company v. Illinois Central et al. Opinion by Commissioner Meyer:

The complainant contends that the rates on cattle between Owensboro, Ky., and Kansas City, Mo.; East St. Louis, Ill.; Chicago and New York are unreasonable, compared with the rates from the same points to Evansville, Ind.; Louisville, Ky., and Cincinnati, Ohio. Reparation is asked. The present rate from East St. Louis to Owensboro is 21.7 cents per 100 lbs. The commission found that this rate was unreasonable to the extent that it exceeds 15 cents per 100 lbs. with a minimum weight of 20,000 lbs. and prescribed that rate for the future. The commission also decided that in future the rate from Chicago to Owensboro should not exceed \$32 per car.

The commission found that the present rate from Owensboro to New York via Louisville was excessive, but no order could be issued, as the complainant had not joined as party defendants the carriers participating in the rates from Evansville to New York. Reparation was denied. (27 I. C. C., 54.)

Joint Rates on Plaster and Gypsum Rock.

In re investigation and suspension of advances in rates by carriers for the transportation of plaster, gypsum rock, stucco, plaster board, from Blue Rapids and Irving, Kan., to points in Arkansas, Kansas and Missouri. Opinion by Commissioner Harlan:

The defendant proposes to cancel joint through rates on plaster and gypsum rock from Blue Rapids and Irving, Kan., to destinations in Arkansas and Missouri. The cancellation of these rates would result in advances ranging from 2 cents to 7 cents per 100 lbs. The complainant asks the commission to require the defendant to continue to maintain the joint through rates now in effect. The commission found that the motive of the St. Louis & San Francisco in cancelling these joint through rates was to compel the consumers on its lines to purchase the commodity in question from the manufacturers whose plants were located along its lines, as it would then secure the entire revenue instead of sharing it with connecting lines on shipments from points of origin not on its own lines. The commission decided that this practice discriminated against the manufacturers who were not located on the lines of the St. Louis & San Francisco and ordered the defendant to withdraw the tariff which would cancel the joint through rates. (27 I. C. C., 67.)

STATE COMMISSIONS.

The Railroad Commission of Montana has issued an order making general reductions in freight rates on fruit and vegetables; and will hold a hearing on the subject on June 10.

The Missouri Public Utilities Commission has announced its construction of the anti-pass section of the act creating the commission, ruling that passes issued before July 1 can be used after that date only by persons excepted in the act.

The Illinois Central and the Yazoo & Mississippi Valley have filed a suit in the federal district court at Baton Rouge, La., attacking the constitutionality of the recent order of the Louisiana commission governing the flagging of trains. Among other points it is contended that by these rules the commission attempts to regulate interstate commerce.

COURT NEWS.

The International & Great Northern has asked the Texas Supreme Court for a rehearing on its recent decision when it issued an injunction to restrain the removal of the company's shops from Palestine, Tex.

The Chicago, Milwaukee & St. Paul has filed an appeal to the United States supreme court from a decision of the Wisconsin supreme court which upheld the Wisconsin law requiring that the upper berth in a sleeping car be kept closed unless it is sold.

The Colorado & Southern has appealed to the United States Supreme Court from the decision of the Colorado Supreme Court sustaining the Colorado Railroad Commission's action in ordering the road to restore service on its branch running over Boreas Pass.

In the federal court at Atlanta, Ga., May 23 in the case of the Georgia State Railroad Commission against the Seaboard Air Line, a decree, signed by Judge Newman, sustained the commission in its order requiring the construction of a connecting track at Lawrenceville, between the Seaboard Air Line and a branch of the Southern Railway.

The supreme court of the United States in a case against the Delaware, Lackawanna & Western has decided that a track laborer on that road is engaged in interstate commerce, and therefore that an injury to him comes under the federal law regulating compensation for injuries. It appears that at the time the man was injured he was hurt or endangered by two trains, one of which was not engaged in interstate traffic; and that because of this situation the railroad company denied the application of the federal law. The circuit court of appeals for New Jersey decided in favor of the road, but this opinion is now reversed. Justices Lamar, Holmes and Lurton dissented from the opinion of the majority.

Hours-of-Service Law Applies to Unwritten Train Orders.

The decision of the circuit court of appeals, at New Orleans, in the suit against the Houston Belt & Terminal Company, in the case of a towerman who conveyed oral train orders by telephone, was noticed in the *Railway Age Gazette*, May 16, page 1109. The head notes of this decision, in full, are as follows:

1. If a towerman gives to another towerman information over the telephone that trains have started, on receipt of which the second towerman must throw switches, line up tracks, and hold trains as a matter of duty and without discretion on his part, it is evident that these towermen use the telephone to despatch, report, transmit, and deliver orders pertaining to or affecting train movements.
2. An order affecting train movements may be given by a wave of the hand or the flash of a lantern, and its disobedience might cause as dire consequences as the failure to obey a written message.
3. To limit the word "orders" as used in the proviso in section 2 of the act to technical "train orders" emanating from the train despatcher's office would be to pervert the plain meaning of the statute.

4. Necessarily an order affecting train movements can be given by any subordinate having to do with trains and switches, such as a towerman.

5. The Government is not bound to negative the exception as to "case of emergency." The railroad must plead and prove facts which constitute such a defense.

The towermen in this case occupied towers about three quarters of a mile apart, near the main station in Houston. The line between the two towers is double track. From the testimony it appears that the time interval system is in use, and that actual operation of the space interval by the towermen takes place chiefly in cases where it is necessary to move trains on one track or the other in a direction opposite to the current of traffic.

As to the fifth point in the head note the court says:

"The railroad contends that the rulings of the court were correct because plaintiff did not negative that the acts and conduct of the defendant complained of came within the exception of the act, which reads as follows:

"... in case of emergency, when the employees named in this proviso may be permitted to be and remain on duty for four additional hours in a 24-hour period or not exceeding three days in any week."

"The action, though for a penalty, is civil in its nature, and the pleader is not required to state his cause of action with the exactness and particularity that would be necessary in a criminal indictment. In the nature of things, in most cases arising under the act, facts bringing the case within the exception would be only within the knowledge of the railroad, and the government should not be required to allege that of which it knows nothing simply to conform to a mere technicality of pleading. If facts existed that would bring the case within the exception, they constituted a defense that the railroad should have pleaded and proved."

Railway Officers.

Executive, Financial and Legal Officers.

W. C. Logan, who recently resigned as secretary and auditor of the Wichita Valley, at Wichita Falls, Tex., has been appointed chief clerk to the auditor of the Ft. Worth & Denver City at Ft. Worth, Tex.

The officers of the Denver & Salt Lake, formerly the Denver, Northwestern & Pacific, are now as follows: Newman Erb, president; W. E. Morse, vice-president and general manager; Ward E. Pearson, treasurer; H. B. Blanchard, secretary, and E. W. Meyer, auditor and assistant secretary.

J. F. Waddell has resigned as auditor for the receivers of the Denver, Laramie & Northwestern. J. L. Terry has been appointed general superintendent and auditor for the receivers, with headquarters at Denver, Colo. The office of superintendent for the receivers is abolished. Effective June 1.

A. H. Wheatley, assistant to the president of the Alaska Northern, and E. L. Davis, general superintendent, both with headquarters at Seward, Alaska, have resigned. Their duties will be assumed by A. W. Swanitz, chief engineer and manager, and H. Tozier, superintendent, with headquarters at Seward.

H. B. Myers, assistant general freight and passenger agent and assistant auditor of the Liberty White at McComb, Miss., has resigned, to accept service elsewhere, effective June 1, and traffic matters formerly handled by Mr. Myers will in future be handled through the office of W. M. White, president and general manager.

B. L. Winchell, president of the St. Louis & San Francisco, and Thomas H. West, chairman of the St. Louis Union Trust Company, have been appointed receivers of the St. Louis & San Francisco. W. J. Jackson, vice-president and general manager of the Chicago & Eastern Illinois, and E. W. Winter, of New York, formerly president of the Northern Pacific and later until 1911 president of the Brooklyn Rapid Transit Company, have been appointed receivers of the Chicago & Eastern Illinois.

H. S. Walker, whose appointment as auditor of Morgan's Louisiana & Texas Railroad and Steamship Company and the Louisiana Western, with headquarters at New Orleans, has already been announced in these columns, was born July 19, 1878, in Princess Ann county, Va. He entered the service of the Seaboard Air Line at the local agency at Richmond, Va., in 1900, and subsequently was made chief clerk. He removed to Fernandina, Fla., in 1902, retaining his position as chief clerk at that point. He went to the Gulf & Ship Island in 1904 as agent at Gulfport, Miss., resigning in 1906 to engage in mercantile business. Mr. Walker returned to railway service in 1908 with the Southern Pacific Lines in Louisiana, and has now been appointed auditor, as above noted.

Operating Officers.

Joseph M. Boyd, assistant general air brake inspector of the Northern Pacific, has been appointed trainmaster of the Fargo division at Fargo, N. D.

R. H. Dwyer, formerly trainmaster of the Illinois Central at McComb City, Miss., and later division superintendent of the Missouri Pacific at Pueblo, Colo., has been appointed superintendent of construction of the Tela Railroad, with headquarters at Tela, Honduras.

James Daniel Beaver, who has been appointed assistant superintendent of the Pittsburg, Shawmut & Northern, with office at St. Marys, Pa., as has been announced in these columns, was born on February 5, 1875, and began railway work as an operator on the Western New York & Pennsylvania, now a part of the Pennsylvania Railroad, and was later agent, and then despatcher on the same road. He left the service of that company to go to the Plant System of railways, now a part of the Atlantic Coast Line, and in 1901 went to the Pennsylvania Railroad as despatcher, resigning in 1905, to become assistant trainmaster on the Pittsburg, Shawmut & Northern, which position he held at the time of his recent promotion as assistant superintendent of the same road.

H. W. Stanley, whose appointment as general manager of the

Seaboard Air Line, with headquarters at Portsmouth, Va., has been announced in these columns, was born on February 13, 1874, at Petersburg, Va., and was educated at Lynchburg High School. He began railway work as a telegraph operator on the Norfolk & Western, and held various positions on the road until December, 1895, when he became chief clerk to the superintendent of the Southern Railway at Knoxville, Tenn. He went to the Seaboard Air Line in May, 1897, and has been in the continuous service of that road ever since, first as secretary to the general superintendent, and then consecutively chief clerk to the general superintendent and general manager, trainmaster, superintendent, superintendent of transportation, assistant general superintendent, general superintendent of transportation, and assistant general manager, which position he held at the time of his recent appointment as general manager of the same road as above noted.

J. F. Keegan, whose appointment as superintendent of the Chicago division of the Baltimore & Ohio, with headquarters at Garrett, Ind., has been announced in these columns, was born on March 29, 1870, at Cleveland, Ohio, and was educated at St. Columba's Academy, in his native town. He began railway work on November 1, 1895, with the Cleveland, Columbus, Cincinnati & Indianapolis as a telegraph operator, and in June, 1890, left that company to go to the Cleveland, Lorain & Wheeling, now a part of the Baltimore & Ohio, as telegraph operator and car distributor. From September, 1891, to May 15 of the following year, he was train despatcher of the same road at Uhrichsville, Ohio, and was then chief despatcher of the Baltimore &

Ohio, at Cleveland. From September, 1903, to September, 1906, he was assistant trainmaster of the same road first at Cleveland and then at Wheeling, W. Va. In September, 1906, he was promoted to trainmaster at Parkersburg, W. Va., and in December, 1910, was transferred in the same capacity to Keyser, W. Va. On March 15, 1911, he was appointed division superintendent of the same road at Wheeling, and in October, 1911, was made superintendent of the Monongah division at Grafton, W. Va., which position he held at the time of his recent appointment as superintendent of the Chicago division, as above noted.

Traffic Officers.

H. Beardshaw has been appointed traveling agent of the Kansas City, Mexico & Orient, with headquarters at Pittsburgh, Pa.

John S. Hickey has been appointed soliciting agent of the Central of Georgia, with office at Chicago, succeeding George B. McGill, resigned.

H. B. Weatherwax has been appointed industrial agent of the Delaware & Hudson, with office at Albany, N. Y., succeeding I. H. Shoemaker, resigned.



H. W. Stanley.



J. F. Keegan.

H. C. Bush, who recently resigned as traffic manager of the Colorado Midland, has been appointed traffic manager of the Idaho & Washington Northern, with office at Spokane, Wash.

J. A. Morgan has resigned as commercial agent of the St. Louis Southwestern at Paragould, Ark., to become traffic manager of the National Cooperage Association, with headquarters at St. Louis, Mo.

W. S. Merchant, traveling passenger agent of the St. Louis & San Francisco, with headquarters at Cincinnati, Ohio, has been appointed division passenger agent at that place, succeeding J. F. Govan, who has been appointed general agent of the passenger department of the Chicago & Eastern Illinois.

W. I. Jones having been promoted to assistant general freight agent, in charge of solicitation, of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, the position of assistant general freight agent, in charge of coal traffic, is abolished. C. E. Warner is appointed coal traffic agent, with headquarters, St. Louis, Mo. Effective June 1.

L. D. Knowles, general agent of the Missouri Pacific, and the St. Louis, Iron Mountain & Southern, at Pittsburgh, Pa., has been promoted to assistant general freight agent, with headquarters at Omaha, Neb., succeeding C. E. Wagar, resigned. C. C. McCarthy, general eastern freight agent, at New York, succeeds Mr. Knowles, and J. B. Trimble, assistant general freight agent at St. Louis, Mo., succeeds Mr. McCarthy.

The following appointments on the Illinois Central are announced, effective May 15: C. C. Kunz, commercial agent at Dubuque, Iowa, in place of M. S. Beals, promoted; Ben Stone, traveling freight agent, with office at Bloomington, Ill., succeeding J. H. Lipsey, resigned to engage in other business; C. L. Netherland, traveling freight agent, with headquarters at Ft. Dodge, Iowa, in place of Mr. Stone; J. F. McMahon, traveling freight agent, with headquarters at Waterloo, Iowa, succeeding J. Rosenzweig, resigned to engage in other business; L. Huekels, contracting freight agent at Dubuque, vice J. F. McMahon, promoted; J. F. Ward, contracting freight agent at St. Louis, Mo.; J. B. Russell and B. E. George, contracting freight agents at Chicago.

Arthur Tipton Stewart, whose appointment as general freight agent of the Missouri Pacific, with office at Kansas City, Mo., has already been announced in these columns, was born May 11, 1872,

at Humboldt, Kan. He received a high school education at Independence, Kan., and began railway work July 1, 1890, as stenographer for the Chicago, Rock Island & Pacific at Topeka, Kan. He went to the St. Louis Southwestern September 1, 1891, as secretary to the general manager, and in June of the following year he was made secretary to the freight traffic manager of the Missouri Pacific. Ten years later, on May 1, 1902, he was promoted to assistant general freight agent, and in September, 1908, he was appointed assistant to the vice-president in

charge of traffic. In January of the present year Mr. Stewart was made assistant to the general traffic manager, with headquarters at St. Louis, Mo., and his recent promotion as general freight agent, as above noted, is effective on June 1.

Edward Henry Calef, whose appointment as general freight agent of the St. Louis, Iron Mountain & Southern, with headquarters at St. Louis, Mo., has already been announced in these columns, was born May 26, 1867, at St. Louis. He began railway work January 29, 1884, as messenger in the freight claim



A. T. Stewart.

department of the Missouri Pacific, and from October, 1893, to May, 1894, was chief clerk in the overcharge division of that department. He was then for two years traveling freight claim adjuster, and from June, 1896, to November, 1897, was live stock agent for Indian Territory. The following year he was in the freight traffic department, and in December, 1898, was made chief clerk to the assistant general freight agent of the St. Louis, Iron Mountain & Southern at St. Louis. From November, 1899, to March, 1905, Mr. Calef was commercial agent at Sedalia, Mo., on the latter date being made division freight agent at Little Rock, Ark. In September, 1908, he was promoted to assistant general freight agent at St. Louis, which position he held until his appointment on May 20 as general freight agent, as above noted.

C. E. Perkins, who on June 1 became assistant general traffic manager of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, with headquarters at St. Louis, as announced in our issue of last week, was born in 1871 in Chicago. He began railway work in 1891 as office boy in the freight office of the Kansas City, Fort Scott & Memphis, at Kansas City, Mo. After five years of service with that road, principally as freight clerk, he went to the St. Louis & San Francisco as chief clerk to the general agent at Kansas City. In 1897 he was made chief tariff clerk for the Kansas City, Pittsburg & Gulf, now known as the Kansas City Southern. He was afterwards made chief clerk in the freight department, and later was appointed assistant general freight agent.



C. E. Perkins.

For a time he was stationed at Texarkana, Ark., as assistant general freight agent and also as general freight agent of the Texas line of that road. In 1906 he was again transferred to Kansas City as assistant general freight agent, and in March, 1909, he went to the St. Louis, Iron Mountain & Southern as assistant general freight agent at St. Louis. He was made general freight agent of the Iron Mountain on January 1, 1910, and is now promoted to assistant general traffic manager of the Missouri Pacific system, as above noted.

Engineering and Rolling Stock Officers.

William J. Ridley has been appointed road foreman of engines of the Fargo division of the Northern Pacific at Fargo, N. Dak.

William H. Dyer has been appointed master mechanic of the Georgia & Florida, with headquarters at Douglas, Ga., succeeding E. C. Hanse, assigned to other duties.

R. G. Knight has been appointed roadmaster of the Northern Pacific at Staples, Minn., succeeding Philip McGuire, who has been retired and pensioned by the company.

G. A. Ziehlke has been appointed signal supervisor of the Kansas division of the Union Pacific, with headquarters at Kansas City, Mo., succeeding Frank W. Pfleging, promoted.

E. D. Jackson, assistant engineer of the Baltimore & Ohio at Baltimore, Md., has been appointed engineer of the Philadelphia division, with headquarters at Philadelphia, Pa., succeeding C. C. Cook, transferred to the Pittsburgh division.

E. C. Carter, chief engineer of the Chicago & North Western has been assigned to special duties in connection with valuation of property of the company and until further notice is relieved from active duties of his office, which will be discharged by W. H. Finley, assistant chief engineer.

Joseph McCabe, whose appointment as master mechanic of the Shore Line division of the New York, New Haven & Hartford with headquarters at Harlem River, N. Y., has been an-

nounced in these columns, was born on December 6, 1863, at New Rochelle, N. Y., and was educated in the public schools of his native town. He began railway work on August 11, 1881, with the New York, New Haven & Hartford and in 1885 was appointed fireman and later was made engineman. In December, 1902, he was promoted to road foreman of engines, and in January, 1907, was made master mechanic, becoming general road foreman of engines later in the same year. In April, 1912, he was appointed master mechanic of the Western division, and now becomes master mechanic of the Shore Line division of the same road as above noted.

Frank W. Pfleging, signal supervisor of the Kansas division of the Union Pacific at Kansas City, Mo., has been appointed signal engineer, with headquarters at Omaha, Neb., succeeding J. C.

Young, deceased. Mr. Pfleging was born May 27, 1877, at Terre Haute, Ind. After graduating from high school he took the electrical engineering course at Rose Polytechnic Institute, graduating in June, 1901, with degree of B. Sc. Between the junior and senior years he was employed by the Chicago & Eastern Illinois as signal repairman, and in July, 1901, he went with the Union Pacific, where he was employed successively as draftsman, maintainer, foreman of interlocking, signal foreman, general signal foreman, until January 1, 1903. On the latter date he was made signal

supervisor, with headquarters at Cheyenne, Wyo., and in February, 1912, he was transferred to Kansas City, Mo., in a similar capacity. His promotion to the position of signal engineer, as above noted, becomes effective on June 1.

Purchasing Officers.

Lewis Mims, superintendent of the Sunset-Central Lines of the Southern Pacific at Lafayette, La., has been appointed fuel and timber agent of those lines, with headquarters at Houston, Tex., effective June 1.

L. B. Wood, general storekeeper of the Sunset-Central Lines of the Southern Pacific, will also assume the duties of purchasing agent, with headquarters at Houston, Tex., effective June 1. R. S. Stephens, who has held the position of purchasing agent for 25 years, has been retired on account of failing health and placed on the pension list of the company.

Special Officers.

The agricultural, industrial and immigration departments of the St. Louis Southwestern Lines have been consolidated, with W. R. Beattie in charge as agricultural and industrial commissioner. W. J. Doyle, heretofore in charge of the industrial and immigration department, has been assigned to other duties. P. T. Cole, L. E. Saupe and C. C. Rockenbach have been appointed assistants to Mr. Beattie, with such duties as may be assigned them by him. Headquarters, St. Louis, Mo.

OBITUARY.

Edwin O. Miller, commercial agent of the Chicago, Rock Island & Pacific at Lincoln, Neb., died in that city on May 20, aged 65 years.

Hon. George G. Crocker, chairman of the Boston Transit Commission, and for 20 years a member of that body, the commission which supervised the construction of the Boston subways, died at his home in Cohasset, Mass., May 26, at the age of 69. Mr. Crocker was chairman of the Massachusetts State Railroad Commission for four years, 1887-1891. He was graduated from Harvard College in 1864, and from the Harvard Law

School in 1866. He was a man of high character and has been a member of the state legislature six terms, during one of which he was president of the senate.

Alexander Forsyth, superintendent of shops of the Chicago, Burlington & Quincy at Aurora, Ill., died on May 19, at the St. Charles hospital, Aurora, aged 68 years. Mr. Forsyth was born in April, 1845, in Cumberland county, England. His entire railway service was with the Chicago, Burlington & Quincy, with which road he commenced work in 1869 as a machinist. From October, 1880, to October, 1881, he was general foreman at Beardstown, Ill., and then became master mechanic at that point. In January, 1887, Mr. Forsyth was transferred to Aurora as master mechanic, which position he held until March, 1906, when he was appointed superintendent of shops.

Archibald Guthrie, of the railroad contracting firm of A. Guthrie & Company, of St. Paul, Minn., died in Chicago on May 15, aged 69 years. Mr. Guthrie began railway work in July, 1866, with the St. Paul & Pacific laying track, and was with that road and the St. Paul, Minneapolis & Manitoba successively as clerk in freight office, brakeman, conductor, purchasing agent, and assistant superintendent, until July, 1881, when he was made superintendent of the Northern division at Barnesville, Minn. Subsequently Mr. Guthrie was consulting engineer, and later he became associated with Foley Brothers, railway contractors, until 1897, when he engaged in business for himself. He was also a member of the firm of Guthrie, McDougall & Company, railway contractors, of Portland, Ore.

Robert S. Seibert, president of the East Broad Top Railroad & Coal Company, died on May 24, at Oak Lane, Pa. He was born on May 9, 1856, and began railway work in January, 1874, as a telegraph operator on the Pennsylvania Railroad. The following October he became agent and operator of the East Broad Top, and in May, 1877, was made trainmaster of the same road. In November, 1881, he became train despatcher on the Chicago & Eastern Illinois, and in March, 1886, went to the West Shore as train despatcher, and was later trainmaster on the same road. In May, 1888, he was on the Denver & Rio Grande, and in October, 1891, was appointed superintendent of the Pueblo Union Depot Company. The following year he was made general manager of the Nevada Southern, and in 1896 became general manager of the California Eastern. From January, 1900, to July, 1902, he was also vice-president of the same road. He returned to the service of the East Broad Top Railroad as general manager in July, 1903. From November, 1903, to January, 1911, he was president and general manager, and since January, 1911, had been president of the same company.

Frank H. Myers, formerly division superintendent of the Chicago, Milwaukee & St. Paul, who died suddenly at his home in Minneapolis, Minn., on April 8, of apoplexy, was born September 5, 1876, at Adeline, Ill.

When fifteen years of age he learned telegraphy, beginning railway work in September, 1894, with the Chicago, Milwaukee & St. Paul, with which company he remained until his death. He was operator and agent until 1900, and then for one year was division operator. From 1901 to 1905, he was assistant train despatcher, and the following two years was chief train despatcher. In 1907 he was made assistant superintendent of the Chicago terminals, and in May, 1908, he was promoted to the superintendency of the Prairie du Chien and Mineral Point divisions at Milwaukee, Wis. He was transferred to Minneapolis, Minn., in October, 1910, as superintendent of the River, Iowa & Minnesota, Wabash and Chippewa Valley divisions, which position he held at the time he died.



F. H. Myers.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

THE INTERNATIONAL GREAT NORTHERN has ordered 10 consolidation locomotives from the American Locomotive Company. The dimensions of the cylinders will be 22 in. x 30 in., the diameter of the driving wheels will be 57 in., and the total weight in working order will be 217,000 lbs.

CAR BUILDING.

THE INTERNATIONAL & GREAT NORTHERN is in the market for 200 coal cars.

THE CHESAPEAKE & OHIO has ordered 2,000 coal cars from the Standard Steel Car Company.

THE LEHIGH VALLEY is in the market for 1,000 forty-ton box cars and 1,000 fifty-ton coal cars.

IRON AND STEEL.

THE MISSOURI, KANSAS & TEXAS has ordered 330 tons of bridge material from the Wisconsin Bridge Company.

THE KANSAS CITY SOUTHERN has ordered 7,000 tons of rails from the Illinois Steel Company.

GENERAL CONDITIONS IN STEEL.—A great deal of attention is being directed to the course of the steel industry in Germany. Prices have been declining abroad and there is likely to be a very heavy falling off in output of steel during the summer months. Many cancellations are reported. So far as the American steel industry is concerned the week opens with very little change. There has been no increase in orders, and prices are stationary. Mills continue to operate full, but smaller specifications indicate a slowing up within the next month or two unless there is a material change in the situation for the better.

PROPOSED PORTUGUESE RAILROAD.—It is proposed to build a railroad in Portugal, from Estremoz, through Souzel, Fronteira, Alter do Chao, and Portalegre, crossing the Eastern Railway and extending to Castello de Vide, on the Caceres branch. When the line yields 5 per cent. net on the cost of construction, the concessionaire must begin an extension from Castello de Vide to the Beira-Beixa line. Free transportation of all necessary construction materials will be granted by the government railways. The usual cost of labor in railway construction work in Portugal is about as follows: Laborers, \$0.47 a day; masons, \$0.75; stone workers and carpenters, \$0.94; bosses, \$1.41.

TRANSPORTATION OF DOGS IN ENGLAND.—For some time past negotiations have been proceeding between the Railway Clearing House and the National Canine Defence League with respect to the conditions under which dogs are conveyed by rail and steamer. The railway companies have now advised the National Canine Defence League that animals tendered for conveyance in packages which are obviously too small for them will be refused. The companies decline to undertake the provision of food, but have agreed to the suggestion of the league that they should endeavor to arrange for the dogs to be given water wherever practicable, if the senders will indicate this requirement on the labels.

PROPOSED LINE FOR CHINA.—The governor of Fukien province, China, has requested the Swatow Chouchowfu Railway to revive the project of a railway to connect Chouchowfu with Amoy, which was under discussion some years ago. The governor suggests that Fukien province subscribe half the necessary capital, the balance to be raised in Kwangtung. This project was originally mooted by Mr. Chang, a director of the Swatow Chouchowfu Railway, who proposed to float a joint stock company in Swatow, but when he died it was dropped. If the money can be raised and the line built it will serve rather to tap the country lying between Amoy and Swatow than to act as a means of communication between the two ports which are already connected by regular steamship services.

Supply Trade News.

The Roberts & Schaefer Company, Chicago, has been awarded a contract by the Cleveland, Cincinnati, Chicago & St. Louis to build five large Holmen coaling plants at Paris, Ill., Lynn, Ind., Lilly, Ill., Anderson, Ind., and Dayton, Ohio.

The "Dracar," made by the Drake Railway Automotrice Company, Chicago, has been selected by the French government for service in connection with the government arsenals and the port of Brest. The Paris office of the company will supply five cars.

J. Campbell Hopkins has been appointed manager of the railway department of the National Oil Gas Generator Company, Chicago. Mr. Hopkins has, for a number of years, been connected with steam railways in the capacity of consulting engineer and internal combustion engine expert.

Allan S. Barrows, for several years western representative of the Pantasote Company, New York, will shortly retire from that position to become vice-president and general manager of the Cassava Products Company, and will be located at Good Hope, Falmouth, Jamaica, British West Indies.

The Forsyth Brothers Company, Chicago, has transferred all right and title in its Forsyth draft gear, buffing device, radial device, truck actuated device and yoke, and the Chaffee centering device to the Waugh Draft Gear Company, Chicago, and all future negotiations and correspondence relating to these devices should be carried on with the Wendell & MacDuffie Company, general sales agents, 165 Broadway, New York.

C. W. Pank, manager of the St. Louis, Mo., office of Fairbanks, Morse & Company, Chicago, has been made general director of sales of that company, with office in Chicago. L. Norvell, manager of the railway supplies department of the same company, with office in St. Louis, has been made manager of the St. Louis office, succeeding Mr. Pank; and F. O. Roy has been made manager of the railway supplies department, with office in St. Louis, succeeding Mr. Norvell.

TRADE PUBLICATIONS.

QUEEN & CRESCENT ROUTE.—The general passenger department has issued an attractive booklet describing scenes along its route, entitled "From the Window."

WRECKING CRANES.—The Industrial Works, Bay City, Mich., has issued a large illustrated folder describing a wrecking crane of 150 tons capacity manufactured by the company.

CHICAGO & NORTH WESTERN.—The passenger department has issued an illustrated booklet on "The Lakes and Resorts of the Northwest," giving information concerning hotels and rates, also a booklet entitled "Summer Vacation Tours," describing the personally conducted all-expense tours to the west, managed by the department of tours of the North Western and the Union Pacific.

AIR COMPRESSORS.—The Chicago Pneumatic Tool Company has issued bulletin No. 34-L, containing general engineering information of value to users of compressed air. It includes tables, giving efficiencies of air compression at different altitudes, densities of gases and vapors, mean effective pressures and horse power, loss of pressures due to friction in pipes, also information for intending purchasers, showing the data required for intelligent estimates. Views of various types of compressors are given, as well as illustrations showing the interior of the company's compressor plant at Franklin, Pa.

GREEK RAILWAY PLANS.—The Greek government is at present giving great attention to the question of improving communication in eastern Macedonia and Epirus, and proposes to link up the railway system in southwest Macedonia with Salonika by enlarging and extending the lines in Thessaly. To this purpose the line from Volo, in Thessaly, to Kalabaka, on the Turkish frontier, will be extended to Grevena and thence to Sorovitch, where it will join the Salonika-Monastir Railway. A branch line will connect Grevena and Janina, the route chosen being via Metzovo or Konitsa.

Railway Construction.

ATLIN RAILWAY.—Application is being made in Canada for incorporation to build from a point on the southern end of Atlin lake, B. C., or near the town of Atlin, southern to a point on the Taku river at the international boundary, and from a point on that line easterly to the southern end of Teslin lake. Smith & Johnston, Ottawa, are solicitors for the applicants.

BRADENTOWN, MANATEE & ARCADIA.—This company is planning to build a line, it is said, from Bradenton, Fla., southeast via Manatee to Arcadia, about 55 miles. Rights of way are now being secured and it is expected that construction work will be started during July. J. G. Barkley, Tampa, Fla.; C. B. Jenkins, Charleston, S. C., and A. W. Jones, Augusta, Ga., are interested.

BRULE LAKE.—An officer writes that surveys have just been finished and the company expects to begin work at once from a point on the Grand Trunk Pacific east of Brule lake at mileage 996 west of Winnipeg, Man., north six miles to the property of the North Alberta Coal Company. The work will be difficult. The line which is being built to carry coal will have maximum grades of 2 per cent. G. G. S. Lindsey, president, and James McEvoy, chief engineer, Toronto. (April 18, p. 925.)

DE QUEEN & EASTERN.—An officer of this company which operates a line from De Queen, Ark., east to Dierks, 27 miles, writes that the company owns the Texas, Oklahoma & Eastern, operating a line from Valliant, Okla., on the St. Louis & San Francisco east to Broken Bow, in McCurtain county, 24 miles. The company has under consideration the question of building an extension in the near future between De Queen and Broken Bow, 25 miles, connecting the two lines. The extension of the De Queen & Eastern from Dierks northeast to Hot Springs, about 70 miles, which has been under consideration for some time, will probably be built next year.

EL PASO & SOUTHWESTERN.—An officer is quoted as saying that construction work will be started soon on a branch from White-water, N. Mex., to the Burro mountains to provide an outlet for the mines of the Burro mountain district.

FORT SMITH, SUBIACO & EASTERN.—This company, which operates a line from Paris, Ark., east via Subiaco to Scranton, 14 miles, will build an extension, it is said, from Scranton east to Dardanelle, about 25 miles.

KANAWHA & MICHIGAN.—According to press reports this company is making plans to build under the name of the Middleport & Northwestern, a branch line from Middleport, Ohio, northeast to Marietta, about 50 miles.

LEHIGH & NEW ENGLAND.—An officer writes regarding the report that a contract has been given to the Reed Construction Company, to build a five mile spur line south to Bath, Pa., that the company is about ready to let a contract to build from Snyder, Pa., to Catasauqua. The work on this five mile line includes handling about 160,000 cu. yds. (May 16, p. 1115.)

LEHIGH VALLEY.—A contract has been given to the John F. Dolan Construction Company, New York, to build the extension of the Seneca Falls branch from Seneca Falls, N. Y., east to Cayuga Junction. (April 25, p. 974.)

MERIDIAN & MEMPHIS.—An officer writes that this road is now in operation from Meridian, Miss., northwest to a point about 22 miles from Meridian, and that the line through to Union, in all 32 miles, will probably be put in operation about the middle of June. (March 14, p. 529.)

MIAMI & SOUTH FLORIDA.—Application has been made for a charter in Florida, it is said, to build from Palm Beach, Fla., south via Miami, and Homestead to Detroit, about 100 miles. The company will have a capital of \$500,000 and headquarters at Miami. H. C. Roome, president.

MIDDLEPORT & NORTHWESTERN (Electric).—Incorporated in Ohio, with headquarters at Columbus, to build an electric line via Meigs, Athens and Washington counties to Marietta. The incorporators include D. N. Postlewaite and J. C. Nickert.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, has asked for bids on June 24, for the

construction of section No. 4 of the Broadway-Fourth Avenue rapid transit railroad. This line will be operated by the New York Municipal Railway Corporation (Brooklyn Rapid Transit) under the Dual System contracts. The Broadway subway is now under construction from Trinity Place and Morris street, in the borough of Manhattan, to a point in Broadway midway between Houston and Bleecker streets. Section No. 4 extends from this point north under Broadway to a point 390 ft. north of the southerly line of Fourteenth street. It will be a four-track subway, and the section includes a local station at Eighth street and half of the express station at Union Square. Bids are wanted for the construction only and are not to include the laying of tracks, or the interior work in stations.

The Northeastern Construction Company, New York, will probably be given a contract to build a 400-ft. subway from the Fourth avenue subway, Brooklyn, as now completed, to the lower track level of the Manhattan bridge at its bid of \$596,400.

OKLAHOMA, NEW MEXICO & PACIFIC.—It is understood that contracts are to be let soon to build from Ardmore, Okla., west via Lone Grove, and Hewitt to Waurika, thence southwest to Byers, Tex., about 70 miles. J. L. Hamon, president, Lawton, Okla. (February 21, p. 373.)

ORANGE-NORTHEASTER.—An officer writes that contracts for building the first ten miles from Natchitoches, La., south were to be let on May 28. The plans call for building from Orange, Tex., in a general northeast direction along the east side of the Sabine river to Merryville, La., thence via Leesville to Natchitoches. J. Tansy, St. Louis, Mo., has been given a contract for some of the work, which calls for handling about 25,000 cu. yds. to the mile. The maximum grades will be 1 per cent. and the maximum curvature 3 degrees. The company has taken over the Nacogdoches Railway, a lumber road, also the Lutcher Moore lumber road, and these lines will form part of the system. J. Alphonse Prudhomme, president, and A. R. Carver, chief engineer, Natchitoches, La. (March 21, p. 692.)

ROME & GADSDEN.—This company will ask for charter in Alabama to build from Gadsden, Ala., northeast to Rome, Ga., about 60 miles. J. B. Wadsworth, president, J. M. Garvin, first vice-president, Rock Run, Ala.; J. N. King, second vice-president, Rome; J. P. Smith, treasurer, Center, and L. S. Daniels, secretary, Rome, Ga.

TAMPA & GULF COAST.—An officer is quoted as saying that \$750,000 of bonds have been sold and the proceeds will be used for building an extension to St. Petersburg, Fla., and to other west coast towns. Surveys have been under way for some time, and it is understood that construction will be started at once.

TEXAS, OKLAHOMA & EASTERN.—See De Queen & Eastern.

RAILWAY STRUCTURES.

ARDENALE, ONT.—See Norwood.

CLEVELAND, OHIO.—The Pennsylvania Lines have received bids for moving the old Euclid avenue station and reconstructing it with a number of additions.

LEXINGTON, KY.—An officer of the Louisville & Nashville writes that some of the bridges are now being reconstructed between Lexington and Jackson, on the Lexington & Eastern. The railway company will build the masonry with its own forces, and contracts for the superstructures have been let to the Louisville Bridge & Iron Company.

NORWOOD, ONT.—The Railway Commissioners of Canada have authorized the Canadian Pacific to construct a bridge on the Toronto subdivision, Ontario division near Norwood station; also a bridge on the Havelock subdivision of the Ontario division near Ardendale station.

ST. LOUIS, Mo.—The Terminal Railroad Association of St. Louis has awarded a contract to the St. Louis Unit Construction Company for the erection of a \$60,000 station building at Third street and Washington avenue.

SPRINGFIELD, MASS.—The Boston & Albany will put up an addition to its freight house 60 ft. long, the new part to be two stories high and to be fitted up for the offices.

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BOSTON & ALBANY.—The New York Public Service Commission has authorized this company to issue \$3,637,000 bonds, to be guaranteed principal and interest by the New York Central & Hudson River, to refund a like amount of bonds maturing October 1, 1913.

BOSTON & MAINE.—In addition to the \$12,000,000 one-year 6 per cent. notes mentioned as having been sold to J. P. Morgan & Co., New York, last week, the company has sold \$5,000,000 of these notes, thus making \$17,000,000 one-year 6 per cent. notes sold to J. P. Morgan & Co. in all. In a letter in regard to the additional \$5,000,000 Boston & Maine notes President Mellen says that \$2,500,000 of the proceeds will be used for payment to the New York, New Haven & Hartford for advances due about June 2, and the remainder will be used for improvements now under way which could not be discontinued without serious loss.

BROOKLYN RAPID TRANSIT.—A quarterly dividend of 1½ per cent. has been declared on the stock, thus placing it on a 6 per cent. annual basis, as compared with the former annual basis of 5 per cent.

CANADIAN PACIFIC.—Baring Brothers & Company, London, have sent a letter to holders of the first mortgage 5 per cent. bonds, due July 1, 1915, offering to redeem these bonds at 102 on June 25, and to pay on July 1 the July 1 coupon.

DENVER & SALT LAKE.—This company has increased its capital stock from \$10,000,000 to \$35,000,000.

DETROIT, TOLEDO & IRONTON.—Judge Sater, of the United States district court, has confirmed the sale made on April 17, of the Ohio Southern division of the Detroit, Toledo & Ironton for \$1,550,000.

LARAMIE, HAHN'S PEAK & PACIFIC.—The bondholders' protective committee asks deposits of the first mortgage 6 per cent. bonds due July 1, 1929, under an agreement which provides that if the committee holds a majority of the \$240,000 bonds outstanding, it may sell them as a block for not less than 95, and also that the committee shall prepare a plan of reorganization.

LEWISBURG & TYRONE.—This property, which includes about 85 miles of road, is to be sold on June 16, under foreclosure of the mortgage securing \$489,000 4½ per cent. bonds, all of which are owned by the Pennsylvania Railroad.

MISSOURI, KANSAS & TEXAS.—White, Weld & Company, and Brown Brothers & Co., both of New York, are offering \$1,900,000 Missouri, Kansas & Texas equipment trust 5 per cent. notes of June 1, 1913, maturing semi-annually to June 1, 1923, at prices to yield from 5½ per cent. on specific maturities December, 1914, to June, 1917, and 5½ per cent. on equal amounts of each maturity or on specific maturities December, 1917, to 1923. These notes are secured on new standard equipment costing \$2,376,000, 20 per cent. of the purchase price having been paid by the railway company in cash.

NEW YORK CENTRAL & HUDSON RIVER.—See Boston & Albany.

NEW YORK, NEW HAVEN & HARTFORD.—See Boston & Maine.

PITTSBURGH & SHAWMUT.—This company is to pay off \$750,000 of the \$3,250,000 equipment and first lien collateral trust 6 per cent. notes, due June 1, 1913, and arrangements have been made with the Guaranty Trust Company and Rhodes & Co. to extend the remaining \$2,500,000 to June 1, 1914, at 6 per cent., the collateral remaining the same. The bankers are offering the new issue subject to the option of the holders of the old issue for extension at 99½, yielding 6½ per cent. Holders of the old issue who agree to an extension will receive \$7.50 in cash for each \$1,000 note extended.

ST. LOUIS SOUTHWESTERN.—Stockholders of the Texas company are to vote on the question of buying the property and franchises of the Stephenville, North & South Texas under the law recently passed by the legislature permitting the merger of certain roads in Texas.

SOUTHERN PACIFIC.—The attorney-general of the United States has stated definitely that unless the Central Pacific is separated from the Southern Pacific he will bring another suit to compel this action.